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Cures

MICHOACAN SYNDICATE.

THE

CHAPATUATO,

OZUMATLAN

AND SINDA

Groups of Silver and Gold Mines,

MICHOACAN,

MEXICO.

1882.

David H. Gildersleeve, Printer, 101 Chambers Street, N. Y.

Michoacan Syndicate,

IN 60,000 SHARES,

(To be increased to 300,000 Shares by vote of Stockholders.)

FULL PAID AND UNASSESSABLE.

PROPERTIES:

Group of developed and producing gold and silver mines in District of Chapatuato.

Group of developed and producing silver mines in District of Ozumatlan.

Group of undeveloped working gold mines in District of Sinda.

Group of gold prospects in the District of Tiquio.

STATE OF MICHOACAN, UNITED STATES OF MEXICO.

Headquarters in Mexico:
CITY OF MORELIA, CAPITAL OF STATE OF MICHOACAN.

Morelia Committee:

Senor DON GUSTAVO J. GRAVENHORST, Banker, President.
Senor DON J. M. SOLORZANO, Banker, Vice-President.
Senor DON PEDRO GUTIERREZ, General Agent.

Agent in City of Mexico,
DAVID FERGUSSON, ESQ.,

ENGINEERS:

ARTHUR D. FOOTE, M. E.
J. C. SIMPSON, M. E.
WM. DENTON, M. E.
JOHN N. TURPIN, M. E.
F. M. F. CAZIN, M. E.

REGISTERS AND TRANSFER AGENTS, THE MUTUAL TRUST CO.

Headquarters in New York:

115 BROADWAY,

Hon. H. A. W. TABOR, *President.*
Hon. ALEXANDER McDONALD, *Vice-President.*
Hon. MILTON SAYLER, *Vice-President.*
WILLIS A. BARNES, *Treasurer.*
BERNARD WHITMAN, *Secretary.*

1882.

MICHOACAN SYNDICATE.

"CHAPATUATO."

MICHOACAN,

MEXICO.

NEW YORK OFFICES:

Rooms 55 to 61 Boreel Building, 115 Broadway, New York.

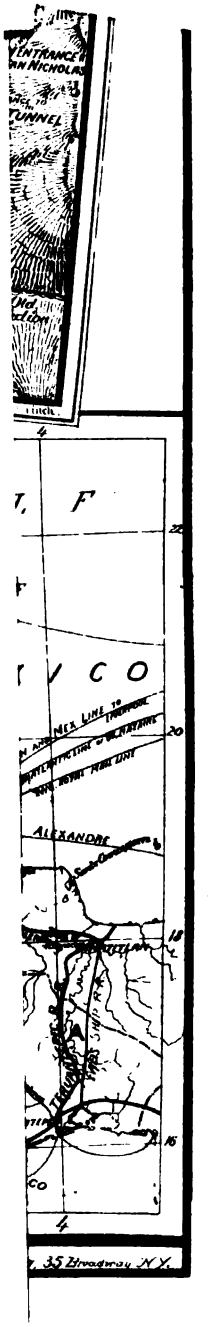
GENERAL AGENT'S OFFICE:

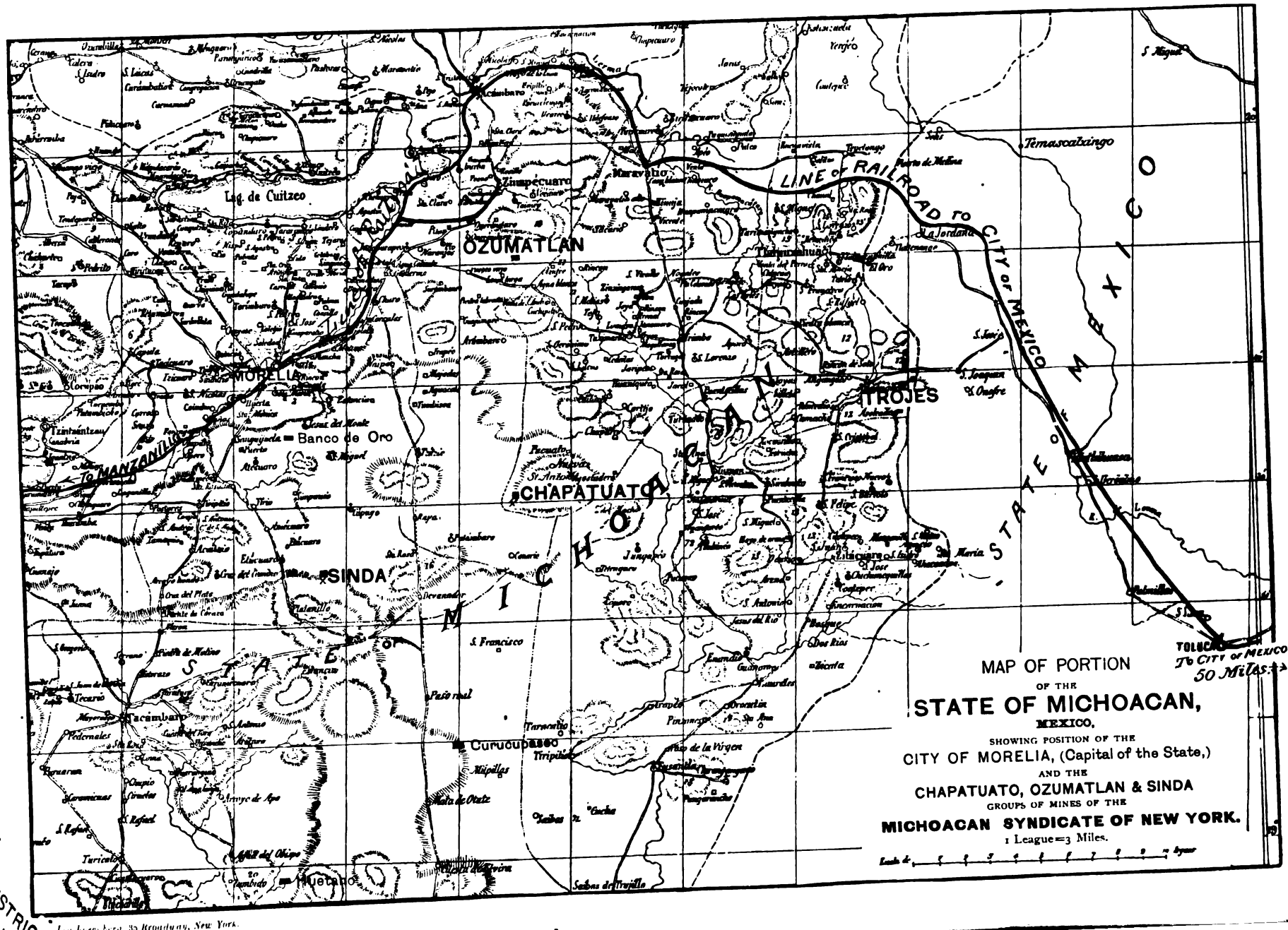
City of Morelia, Mexico.

1881.

1884, Jan. 7. Gift of
Hon. Samuel A. Green,
of Boston.

~~F1614~~
Eng 1438.82





DISTRICT
COAL

Leo Isaacberg, 35 Broadway, New York.

THE CHAPATUATO GROUP OF MINES

IN THE

STATE OF MICHOACAN, MEXICO.

In August, 1880, Mr. William Denton, Civil and Mining Engineer, a resident of Mexico, and professionally employed in various parts of the Republic for the past twenty-five years, visited these mines, examined them with great care, made contracts for them with the owners, and in December came to New York with samples of the ores from the various mines.

Upon the basis of these contracts and his statements as to the great value of the mines, an association of mining men of large means and experience was formed to work these mines, under the name of the

MICHOACAN SYNDICATE.

The syndicate immediately fitted out a commission of able mining engineers, and sent them to Michoacan to re-examine the mines and verify Mr. Denton's reports and judgment. These engineers spent some two months in the work, and have returned, and make their reports fully confirming Mr. Denton's statements, placing even a higher valuation upon these great properties.

Mr. Denton's original report upon the Chapatuato group is here given, and followed by the subsequent reports of Mr. Arthur D. Foote, M. E., and Mr. J. C. Simpson, M. E.

THE MINES OF CHAPATUATO, MEXICO.

REPORT OF WM. DENTON, M. E.

The Chapatuato *mineral* or group of mines is situated between thirty and forty miles south-east of the city of Morelia, State of Michoacan, Mexico.

San Nicolas is a well defined fissure vein running due north and south. The nature of the country rock is slate and porphyry. The width of vein on the surface is thirty-three feet, the inclination sixty degrees, and the dip west. At a depth of twenty feet there are two inclines, one running due north, the other north-west, connected at the distance previously stated, one hundred and fifty-four feet, by the drift. At the termination of the inclines there are five threads of ore, separated from each other by a soft cement and soap stone. The average values of the ores at this depth per ton of two thousand pounds is $137.44, silver and gold, or in other words $129.30 silver, $8.14 gold.

The summit of La Bufa Mountain is two thousand five hundred feet above the plain or bed of the creek where the vein crosses. When this examination was made the aggregate width was sixteen and forty-hundredths feet. Four men extracted from this mine between $4,000 and $5,000 in eleven weeks without all the tools required. The ore now lies at the mouth of the mine. The manager or agent has prohibited the taking out of any more ore until suitable methods can be obtained for its working within, or up to a reasonable percentage of its assays.

This lode is beautifully situated for its development and future workings. A tunnel can be run in on the vein from the south, which would place it four hundred feet below the present works, and one thousand eight hundred feet below the north extension and summit of the mountain. One thousand feet south, where this lode crosses the gorge, there is a stream of water sufficient for all milling purposes, and, the greater part of the year, for the driving of any reasonable amount of machinery. Wood and timber are on the spot sufficient for all time. This lode crosses a creek of running water, and from the present works

can be seen cropping out in bold relief. Ascending the mountain, La Bufa, in a due south course, more than three thousand metres, the course does not vary a degree. In a distance of five thousand metres, four extensions have been taken up and located.

The lode appears to me better defined on the surface. As we approach the south, especially on the second extension from the creek, a tunnel can be run into the Bufa Mountain which would place the bed of the tunnel two thousand five hundred feet below the apex of the mountain, on the third or fourth extension. This is a formidable vein, thoroughly defined, more so than any I have seen on this tour. It speaks for itself. I feel satisfied of the genuineness of its character, and that there can be no two opinions as to the immense value of this property. The owners are now busily at work putting the mine in first-rate order, agreeable to the mining laws of the country, and will shortly commence operations on the extensions. Here on the ground are all the natural elements for the working of a hundred mines for a century, and an abundance of ores of the same character as those which accompany report. An analysis will show the proper mode of working them, and with suitable appliances, there can, in my opinion, be no question as to the results being a complete and great pecuniary success. The dimensions of this mine are two thousand six hundred and twenty-four by six hundred and fifty-six feet.

Santa Rita de la Coto is an old mine. Its course is north and south, inclination sixty degrees, dip east, width of vein thirteen feet, width of ore three and thirty-three-hundredths feet, working shaft one hundred and fifty feet, and tunnel three hundred feet. In order to connect with the shaft it is necessary to drive the tunnel fifty-two and fifty-hundredths feet farther, and then drift east about the same distance. The vein is known as the Corona or Crown, and its ores are said to be very rich and abundant.

Of the Divina Providencia, the shaft or works are situated about three hundred and fifty metres west of the San Nicolas. The course of vein is north-east, inclination seventy-five degrees and dip east. This lode runs into the San Nicolas. At the juncture of these two mines or veins, it is very probable that large bodies of rich ore will be found, which will add to the wealth of the already rich mine, San Nicolas.

La Purissima in its new vein shows on the surface a thread of rich ore, five inches wide, and lies three hundred and twenty-eight feet west of the Divina Providencia. Its course is north and south, width one metre, or three and twenty-eight-hundredths feet, its inclination is sixty degrees and dip west.

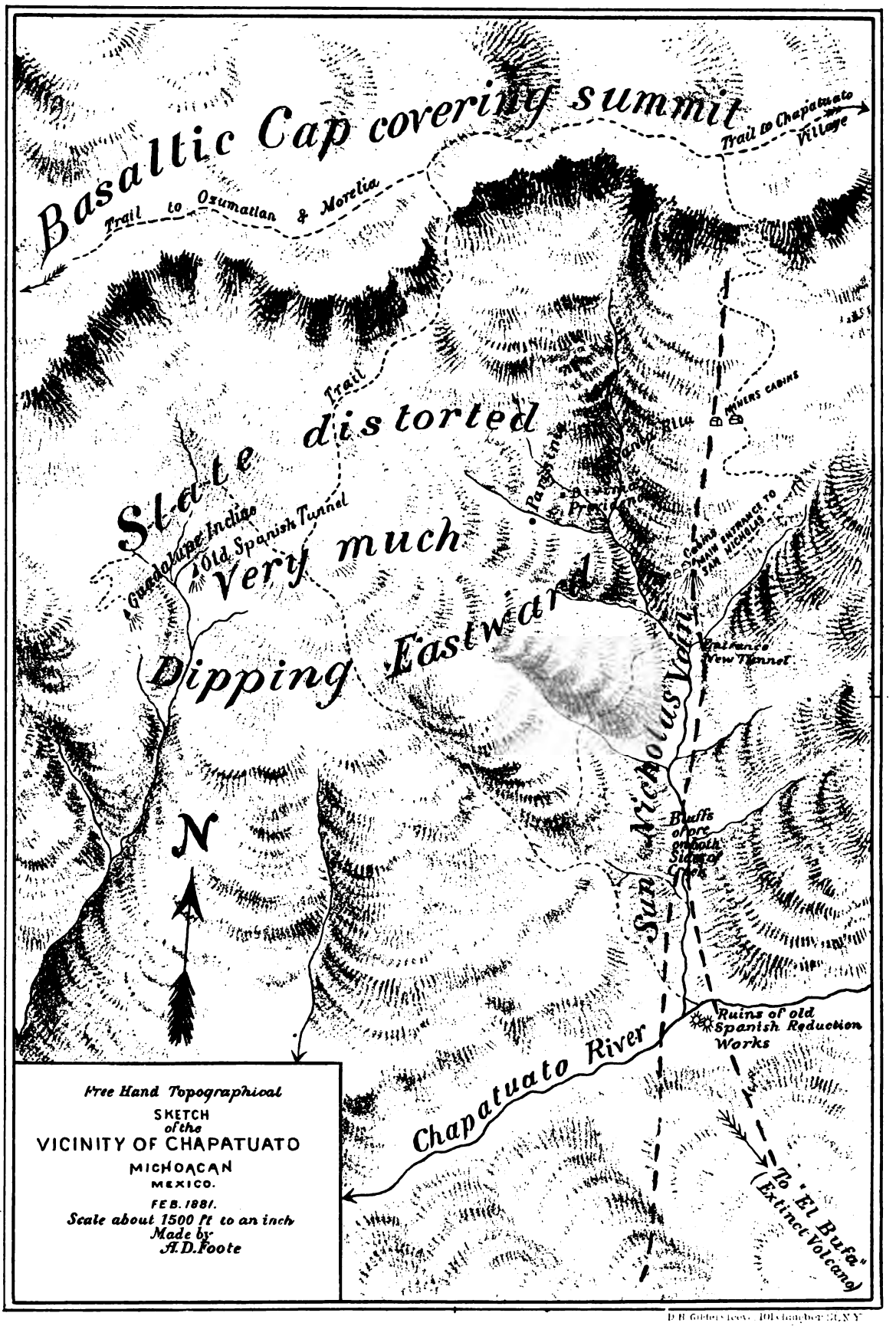
The Potrero lies about three hundred and fifty metres, or one thousand one hundred and fifty-eight feet north-east of where the extension of the San Nicolas crosses the Bufa Mountain at its apex. Its course is north and south, its inclination nearly perpendicular, and its dip east. The ores assayed from the croppings on the summit, two thousand five hundred feet above the level of the creek, are gold $5, silver $5.83, or $10.83 per ton of two thousand pounds. This lode, I believe, will turn out well and can eventually be worked in conjunction with the San Nicolas. It is admirably situated, can be worked by tunnel, having two thousand five hundred feet or more of cover overhead, or above the plain or bed of the creek.

The San Antonio, adjoining the Chapatuato, is located on the Rancho de las Cuevas. Its course is north and south, inclination fifty degrees and dip west. The width of vein is nine and eighty-four-hundredths feet. Another vein in the immediate vicinity has a course north and south, inclination fifty degrees, dip west, and width of vein six and fifty-six-hundredths feet.

In conclusion, the mines of Chapatuato and vicinity have given, and are now giving, conclusive evidence of their richness. The only mode that has ever been adopted in working the ores has been a crude mode of smelting, and I feel satisfied that they leave at least one-third of the bullion in the "slag." The climate is excellent, all the natural elements for the working of these mines being present in great abundance. Labor is cheap and plentiful. With a little outside intelligence, energy and capital, combined with the modern appliances, in my opinion, immediate brilliant pecuniary results are certain.

WM. DENTON.

MORELIA, MICHOACAN, MEXICO, August 24, 1880.


Basaltic Cap covering summit
Trail to Ozumatlan & Morelia
Trail to Chapatuato Village
Trail
Slate distorted
Very much
Dipping Eastward
Guadalupe Indios
Old Spanish Tunnel
Parshing
Miners Cabins
Cabins
Main Entrance to San Nicholas
Entrance New Tunnel
San Nicholas Vein
Bluffs of ore on both Sides of Creek
Ruins of old Spanish Reduction Works
Chapatuato River
To "El Bufa" (Extinct Volcano)
N
Free Hand Topographical
SKETCH
of the
VICINITY OF CHAPATUATO
MICHOACAN
MEXICO.
FEB. 1881.
Scale about 1500 ft to an inch
Made by
A.D. Foote

To the Trustees of the Michoacan Syndicate, New York:

The following reports of the mining properties of Michoacan, in which you are interested, are respectfully submitted for your consideration.

At your request I left New York on the 6th of January by steamer, and spent over two months in Mexico.

The gentlemen in the cities of Mexico and Morelia connected with your enterprise did everything in their power, not only to facilitate my work at the mines, but also to make my stay in the cities, and my trips through the country, pleasant in every way. Their generous hospitality and kindness was such that one might almost believe the often repeated expression of politeness of the country, "My house and everything that I have are at your disposal," to be literally true.

That I consider the country safe for business may be inferred from the fact that Mrs. Foote accompanied me on the trip, two hundred and fifty miles of which was through the interior, by stage coach one way and on horseback returning.

The southern part of the central plateau of Mexico is, more than half, rich agricultural lands; consequently living is cheap. Labor is plenty and also cheap, miners' wages being thirty-seven and one-half cents per day.

Iron and manufactured articles must be imported and are expensive.

The Mexicans are inferior miners, being small men, and untaught in modern methods of mining; still they are remarkably quick and industrious, and under good foremen these qualities will partially make up for lack of strength and knowledge.

Freight from the city of Mexico is now transported by carts or wagons. From Mr. Kingsley, Chief Engineer of the Morelia division of the railroad, I learned that the road would be running from Morelia to the city of Mexico within twelve months from this date. There are now over three thousand men working at different points on this line. Wood and water near the mines are abundant and the climate nearly perfect.

Very respectfully, your obedient servant,

A. D. FOOTE.

New York, April, 1881.

REPORT OF ARTHUR D. FOOTE, M. E.

ON THE MINING DISTRICT OF

CHAPATUATO, MICHOACAN, MEXICO.

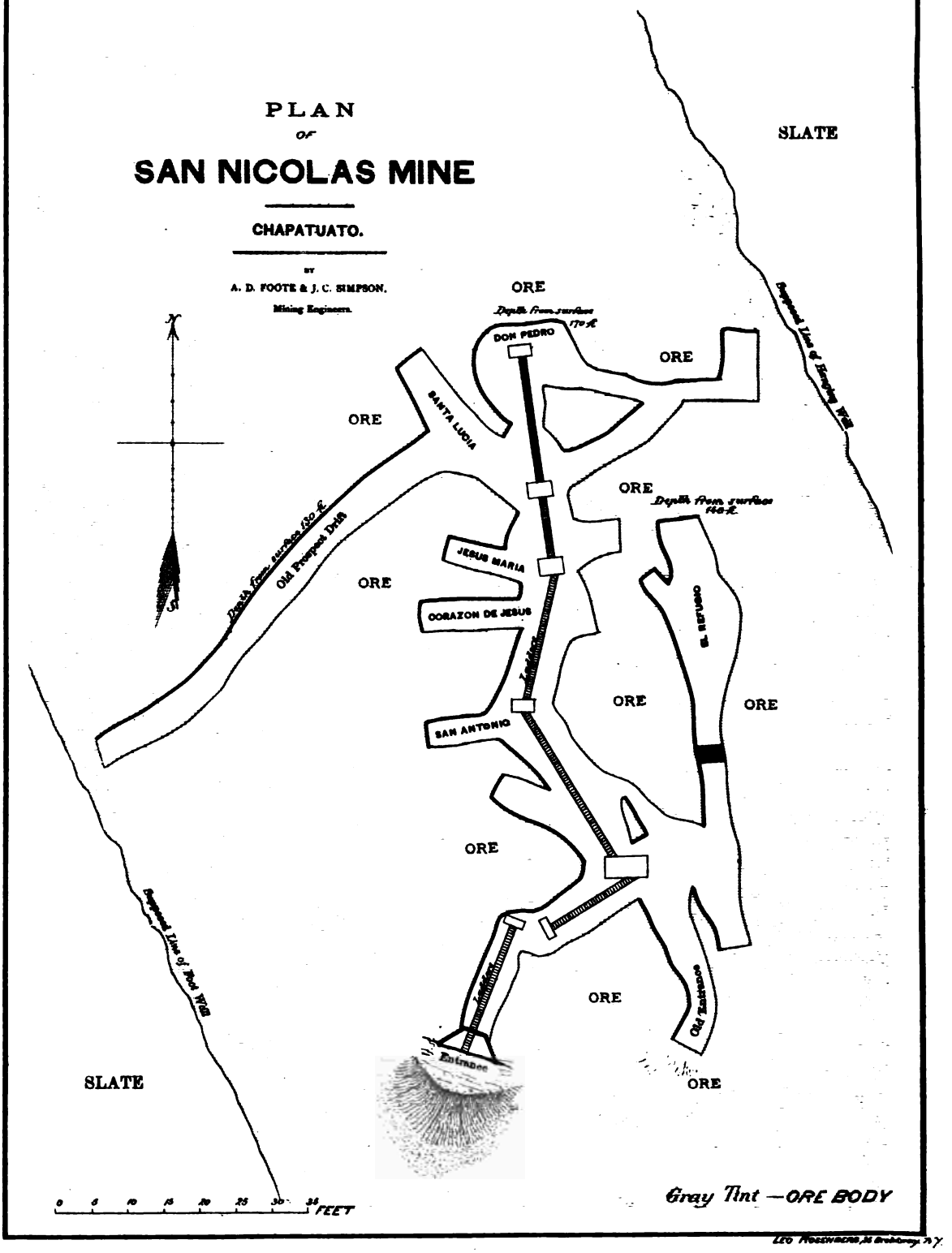
THE CHAPATUATO DISTRICT.

The mines of this district are situated about sixty miles (by trail) nearly east from the city of Morelia, in the state of Michoacan, Mexico. The nearest point of the railroad will be about forty miles by a trail which passes through Ozumatlan. The question of transportation to and from this mine is quite a serious one, and would be much more serious but for the fact that no heavy hoisting or pumping machinery will be required to work the mines for many years. By the present trail a mule can take three hundred pounds from the railroad to the mines, or vice versa, in one day, at a cost not exceeding one dollar. A way could be easily made to take loaded wagons *into* the district, via Ozumatlan, at a small cost, but to bring loaded wagons *out* would necessitate the construction of a long mountain road up a steep rise of about three thousand feet. In an easterly direction, about sixty miles, are situated, at Trojes, the smelting works of a large English Company. If desirable (as it probably will be) for a time, selected ore could be sent to these works, the transportation costing (without any roads being made) about thirty dollars per ton, the milling charges averaging about forty dollars per ton. It is probable that an easy road could be opened toward Trojes, as the mountains appear to open in that direction. I did not have time to make any examination of the country; I was informed, however, that ore could be shipped from Chapatuato to Trojes on mules, for about fifteen dollars per ton. I think thirty nearer correct. From the above statements it will be seen that machinery for reduction works can be transported to the mines from the railroad with no serious difficulty, and that the ore can be shipped to the nearest reduction works, when desirable to do so, at rates that are not prohibitory on rich ore. The country rock of the district is a medium hard slate, distorted and twisted in nearly every possible way, with a general dip of about forty-five degrees to the eastward. Through this slate run thousands of little quartz seams or stringers, the larger ones generally more or less con-

PLAN
of
SAN NICOLAS MINE

CHAPATUATO.

BY
A. D. FOOTE & J. C. SIMPSON.
Mining Engineers.



LEO ROSENBERG, N. Bridgeport, N.Y.

formable to the stratifications of the distorted slate. These sometimes widen into bunches and in several cases into lodes, of which I shall speak further on.

The San Nicolas is an immense true fissure vein of quartz and porphyry, which, standing nearly perpendicular, cuts through the country rock north and south for over three miles, branching once only, where it crosses deep cañons, standing out clear and strong, showing perfectly defined walls perpendicular against the slate, which it apparently has crowded into every conceivable shape, to make room for itself. It resembles in many points the Homestake vein of the Black Hills, and is stronger and larger; similar porphyry, only less of it; similar slate walls, only, if possible, more distinct, and the ore bodies with the horses of porphyry are quite similar. The ore, however, is very different. The vein varies from seventy-five to three hundred feet in thickness. I could see it well only in the cañons or in the mine, the outcrop being generally decomposed and smoothed over as in the Black Hills gold mines.

In the workings of the San Nicolas mine (see map), I found neither wall exposed. At one point a little slate showed in the corner of a stope, but not enough to distinguish whether it was a "horse" or a wall. At another point, which the foreman of the mine said was the wall, a blast disclosed a continuation of the ore body. There were small "horses" of porphyry and layers of clay running through the workings, generally in a north and south direction, but nearly everything around the drifts and stopes was ore. At the bottom of the mine it appeared to the best advantage. There was a face at this point, twelve by thirty-six feet, showing nothing but ore, with the roof, floor and both sides in the same condition. Just upward from this point, going toward the stope called Santa Lucia (see map), is a horse of porphyry about eight feet thick. The Santa Lucia is a small stope in circumference, but about twenty feet high, showing ore on all sides. The long drift (see map), running south-easterly, was only partially cleaned out, but the sides and roof show ore, except two narrow horses of porphyry and clay, which cross it in a north and south direction, or parallel with the course of the vein. The Refugio shows ore on nearly all sides, only one horse (probably the same as in the Santa Lucia) crossing it. Climbing upward through the irregular and crooked incline, ore shows at nearly every point in roof, floor and side stopes, but steadily growing poorer in quality, until, near the surface, in a little side stope, where the miners have their cross with a candle burning in front of it, it is probably too poor to work.

Of the amount of ore actually in sight in this mine, it is impossible to make an estimate. The workings show ore nearly everywhere. The map shows

the workings to be too extensive for a small pocket, with a shell of porphyry all around it. The formation, quartz and porphyry with slate walls, is one that can carry large bodies of ore. The vein is unmistakably strong, and carries ore at other points, of which I shall speak hereafter. The deepest point in the mine is the best. Taking these facts into consideration, with other "indications" found by a careful examination of the mine, I am of the opinion that the ore body is only "slightly touched" in comparison with what will be found. Supposing, for instance, that the ore extends one hundred feet below the present workings, as we have every indication that it does much more than this; then if we allow the ore body to be as large as we know it to be in the present workings, there will be over two millions of dollars' ($2,000,000) worth of ore, allowing only twenty dollars per ton profit.

The assays of samples which I took from this mine ran from a few ounces up to four hundred dollars in silver. My opinion is that the average assay value of the ore is about seventy-five dollars. By sorting a little the average can be raised very much, as the low grade is extremely low and easily discernible. The ore contains, beside the silver, a little gold, antimony, sulphur, and a little lead, not enough, however, to interfere seriously with amalgamation.

The mine was worked under Spanish control before 1810. During the revolution of that time the Spaniards were either driven off or killed, and the mines, which had been such frightful prison pens for the miners, were destroyed as far as possible and deserted. The ruins of old reduction works (proving that amalgamating was done), are still to be seen near the Chapatuato Creek on this property. The present owners have done little more than clean out the old workings. There is ore on the dump said to be worth thirty thousand dollars, but I did not examine it.

Leaving this mine and following the vein down the line northward (see map), at the point marked on the map "Entrance to New Tunnel," a branch of the creek comes down, cutting across the vein and exposing it well. A tunnel is being started from this point which will run in on the vein to the northward, reaching the San Nicolas mine about three hundred feet below its present workings. I found a little ore on one side of the surface croppings, but there was nothing to indicate whether there was any body of it or not. Passing northward and downward again the vein crosses the creek, showing very strong, but I could find no ore. A little further on, however, on the west side of the creek, the vein branches (see map). The branch going to the south-east recrosses the creek as shown. At this point the vein and creek run nearly in the same

direction, thus making a long exposure of the former on each side of the creek in the form of bluffs from fifty to one hundred feet high and two hundred feet long.

I spent much time examining these bluffs and never succeeded in finding a piece of rock which was not ore. On the west side the bluffs appeared to have been quarried down and stoped backward. There was an old tunnel, caved in, and drill-marks, etc., which showed that, in former times, no small quantity of ore had been taken away. On the east side also were small tunnels and drifts (at this time nearly full of debris, making it impossible to enter them), proving that, under Spanish rule, these bluffs were appreciated.

The amount of ore in sight here depends, of course, on how far it reaches into the hills. There are two surfaces, each at least seventy-five by two hundred feet, plainly marked on each side of the creek. From the tunnels in them they surely have some thickness. The formation, to me, indicates great thickness on the west side, at least three hundred feet. On the east side it is idle guess-work to give any thickness.

But supposing it extends each way only one hundred and fifty feet, there would then be two bodies of ore, each two hundred feet by seventy-five feet by one hundred and fifty feet, giving two hundred and twenty-five thousand tons of ore each, which, if we allow only ten dollars per ton profit, would give four and one-half millions of dollars ($4,500,000).

From the assays made of this ore I estimate that nearly half of it will be too poor to work, and the remaining half will give an average assay value of from seventy-five to one hundred dollars per ton. Selected ore can be made to run up to three hundred dollars ($300) per ton. The ore is of the same general character as the San Nicolas, but showing more antimony.

From this ore to the place for the reduction works (where they were before), is about a thousand feet southward and downward. An easy road can be constructed along the creek bank at small cost.

The south-east branch of the vein appears on the bank of the Chapatuato Creek, but is not very strong, and as it soon ran out of the property I did not try to trace it up the side of the Bufa, or extinct volcano, which rises to the southward. The main vein I traced a long distance after crossing the Chapatuato Creek, where it shows strongly, but carries no ore. About fifteen hundred feet from the creek is a shaft sunk some twenty-five feet, showing a good vein, but only small traces of ore; still further on a similar shaft in the vein, with good indications, but no ore.

The owners of this property have four thousand eight hundred meters (about 15,000 feet) along the San Nicolas vein—two thousand four hundred

meters (seven thousand five hundred feet) each way north and south from the entrance of the San Nicolas mine, with one hundred meters (three hundred feet) on each side of the centre. This includes a very good site for reduction works at the point marked on the map as the ruins of old reduction works; also the water right of Chapatuato Creek, which is a stream carrying over five thousand miners' inches of water in the dry season (when I was there), and is very rapid. I estimated by my eye that a mile of ditch would give five hundred feet head of water.

As before remarked, no hoisting or pumping machinery will be needed on this property for years. A tunnel started in the vein near the old reduction works could follow and prospect it, cutting under the bluffs of ore say three hundred feet, and on reaching the San Nicolas mine would be nearly or quite fifteen hundred feet under the surface, while if ore were found to the southward a tunnel from nearly the same point could reach a cover of three thousand feet, where the vein crosses the Bufa ridge. Not that I think it would be advisable to start these tunnels immediately. There is ore enough at hand to allow such prospecting to wait until the mine can pay for it.

In working this property I would offer a suggestion, that the New Tunnel be kept going, and one started on each side of the creek into the bluffs. That by practical tests the best way of reducing the ores be found, then small reduction works be built only sufficient to pay the running expenses of the mines, and the mines then prospected as rapidly as possible. If advisable, selected ore might be shipped to Trojes. Let the extra ore on the dumps or in sight in the mine be in such quantities as to make the outlay for large works sure to pay. Then, after a year from the present time, when experience has shown the best method for reducing the ores, and the railroads have made transportation cheaper and surer, build large works, which could be paid for out of the mine, and work on a large scale with a well developed mine, knowing where the ore is coming from for months ahead.

Beside the San Nicolas, there are, at Chapatuato, several other mines of value which I have examined. They occur, however, in a very different manner from the San Nicolas. The country rock of slate is traversed, as I have before remarked, by numerous streaks of quartz. The Santa Rita, Divina Providencia, Purissima and Guadalupe mines—or better named, prospects—are in these quartz streaks greatly enlarged and lying conformable with the stratification, dipping eastward in a general way at an angle of forty-five degrees, with a north-east and south-west general strike, but, as the slate is much twisted and distorted, these veins dip and twist with the slate. They are probably all on the same vein. The first

three I am very confident are the same. The ore contains more sulphur, iron and antimony than the San Nicolas, and is claimed to be richer in silver.

The Santa Rita was worked previous to 1810 and has only been cleaned out since. It is simply an irregular incline of say forty-five degrees, going into the mountain about seventy-five feet, in a north-east direction. It shows ore on each side, in a vein of the most varying thickness, averaging say three feet.

The Divina Providencia is very similar in every way, but is recent work. The vein shows richer ore, however, and is from two to six feet thick.

The Purissima is a tunnel, in about one hundred and twenty feet, following the strike of the vein. This is all old working, and shows a larger vein and richer ore than either of the previous, and being a tunnel is much more cheaply worked. Taking out ore might be begun immediately at the rate of ten or twenty tons per day. I consider this prospect a very valuable one.

The Guadalupe is to the north-west across a high ridge, but it is so similar in character in every way, that I incline to the belief of its being a continuation of the same vein. It is simply an incline, and exposes ore along its sides. The old Spanish tunnel (see map) shows similar ore, and is probably the same vein. These properties, although they are a little more than prospect, are still probably of great value. They can all be easily worked by tunnels, and I advise the consolidation of them with the San Nicolas mines. It will give great assistance to any one managing the San Nicolas to have these also. He can then control the whole district and govern it accordingly. The titles of all these properties, including the San Nicolas, come direct from the Mexican Government, and are considered the best possible. My opinion is that they are all that could be desired. Of wood and timber there is a sufficient quantity in all directions near the mines. The climate is as perfect as one could well imagine, though I think transportation over the trails during the rainy season (July to September) will be difficult.

As to the safety of mining enterprises in this country in regard to robbery or murder, a man who has sufficient ability and tact to conduct the business part successfully, need have no fear from the other dangers. There is much less violence here than in the Black Hills when the large mines were started there.

With the contracts now made with the owners of the properties herein described, and with the proper man or men sent to the mines to manage them, there are few enterprises in which a small amount of money promises such good results as in the Chapatuato district.

A. D. FOOTE.

New York, April, 1881.

THE MICHOACAN SYNDICATE, New York, April 18th, 1881.
115 Broadway, New York.

Gentlemen:

In accordance with instructions received from you in January, I have visited and examined the Michoacan Mines, Mexico.

Herewith please find reports on the three districts in which you are interested, and to which my attention was directed during my three months' absence.

Very respectfully,

J. C. SIMPSON.

REPORT OF J. C. SIMPSON, M. E.,

ON THE MINING DISTRICT OF

CHAPATUATO, MICHOACAN, MEXICO.

The Chapatuato Mines are situated forty miles east of the city of Morelia.

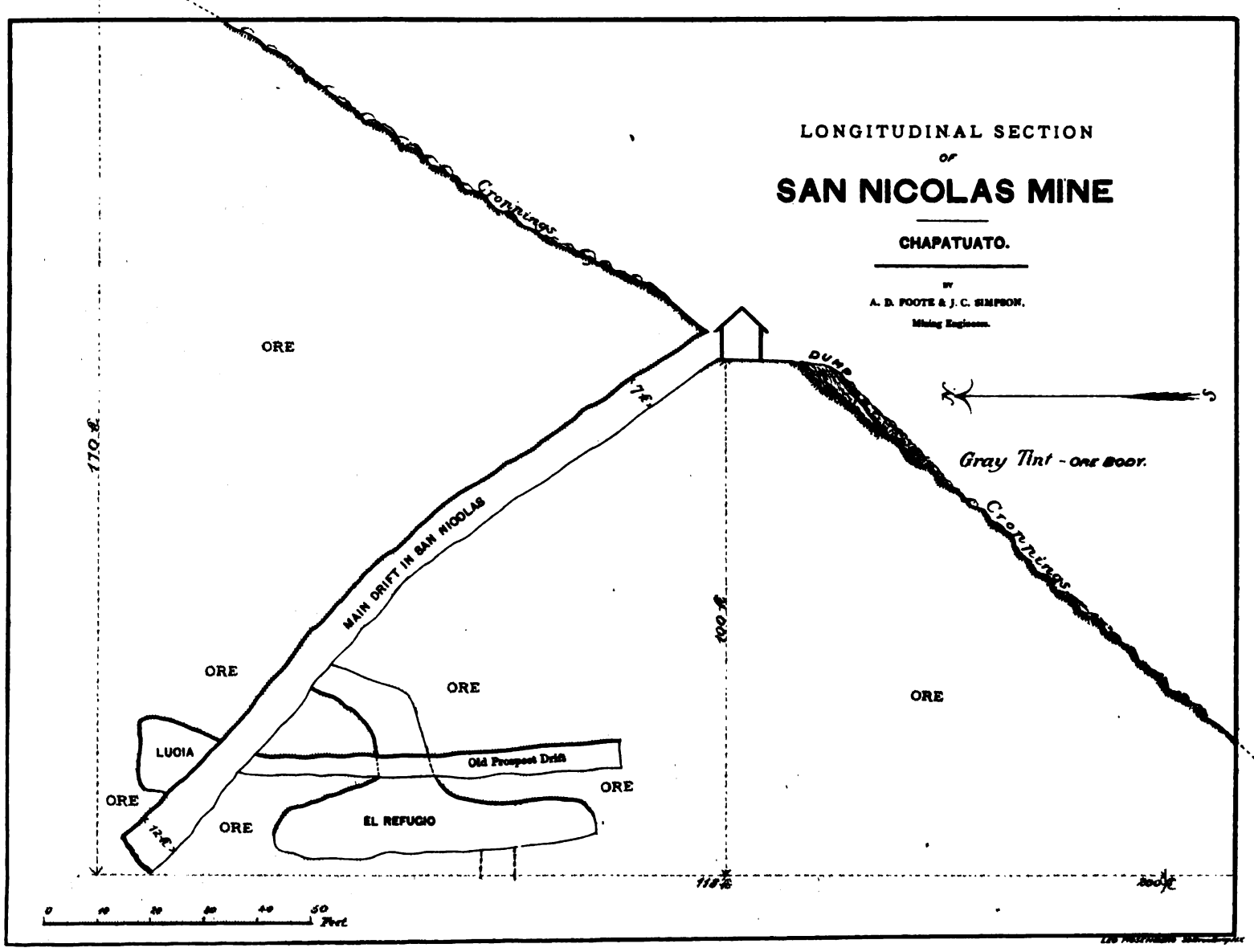
HISTORY.

The history of these mines is much the same as that of Ozumatlan and many others in Mexico, discovered and developed under the Spanish rule, and allowed to lie dormant since its fall, in the beginning of the present century.

SAN NICOLAS VEIN.

The country rock is slate, the fissure is a true one, trends north and south, and dips to the east at an angle of eighty degrees. The gangue is quartz, and the ore carries silver, a trace of gold, and a small percentage of antimony and galena. The San Nicolas pertenencia extends upon the course of the vein fifteen thousand six hundred feet (15,600 feet) by six hundred and fifty feet (650 feet) wide, reaching clear across the valley in which is the Rio Chapatuato, and almost to the summit of the mountain ranges on either side. The depth of the valley below is about two thousand five hundred feet.

This immense lode can be traced without difficulty from the northern end of


LONGITUDINAL SECTION
OF
SAN NICOLAS MINE
CHAPATUATO.
BY
A. D. FOOTE & J. C. SIMPSON,
Mining Engineers.
Croppings
ORE
DUMP
N.
S.
Gray Tint - one door.
MAIN DRIFT IN SAN NICOLAS
ORE
ORE
ORE
LUCIA
Old Prospect Drift
ORE
ORE
ORE
EL REFUGIO
170 ft.
100 ft.
0 10 20 30 40 50 Feet

the property (on the actual summit it is obscured by a basaltic cap), to the point on side hill where the San Nicolas mine is situated, one thousand feet vertically below.

The developments in the San Nicolas bear out the high expectations which are raised by an examination of the croppings to this point. The various drifts, as may be seen on reference to the accompanying plan, demonstrate, beyond any doubt, the vein matter to be over one hundred feet in width, of which sixty feet is strong, rich ore of a high grade. The entire area of workings is in good ore, with the exception of the old prospect drift shown on plan, which is only partly so. At the entrance and for the most part the stope is eight feet high, but at the face and a distance of twenty-five back, the main drift is twelve feet high and fifteen wide. The showing throughout is excellent, but at this point it is simply enormous.

Assays made from specimens taken throughout this mine, selected carefully, and with a view of obtaining a reliable working value, give a net average of $75 per ton.

During the past year miners have been employed clearing out the drifts. About one hundred and fifty tons of ore now on the dump have been mined. In the El Refugio drift of the same mine, a shaft not yet cleared out proves the existence of drifts at a greater depth than is shown in the accompanying longitudinal section.

Following the course of the lode, we find that three hundred feet vertically below the mine the croppings are very prominent at the point where a small creek crosses its course. The entire width is about one hundred and fifty feet, and it stands boldly out from the slate country rock on either side.

A careful search across the lode at this point failed to discover the ore body, but in the creek, three hundred feet vertically below, at which point the lode appears to divide, there is a very large showing.

The creek here is about fifty feet in width, and running on top of the vein. On the western side, ore is in sight for a distance of two hundred feet. At one point a drill-hole is seen, and from the appearance of the surface, a tunnel has evidently been cut. On the east side of creek, a very large bluff of ore is plainly visible, into which half a dozen holes have been cut. These, from their appearance, are not supposed to have been much worked.

At the intersection of the Rio Chapatuato on a comparatively level piece of ground, ten acres in extent, are the remains of the arastras used by the former owners, but no traces of furnaces were found.

Three hundred yards horizontally, and about five hundred feet vertically up the side of range to the south of property, a shaft has been sunk and the vein exposed. The width is one hundred feet, and it looks extremely well.

The San Nicolas appears to be an immense vein of quartz and porphyry, with slate on both sides, carrying with it bodies of rich ore of vast proportions. It will probably at many points be divided by horses of porphyry, but it is extremely seldom that such a rich showing is found as is to be seen here. It would be possible after a short time of drifting to take a very large output from this mine, and at $75 per ton, average value, realize handsome profits.

LA PURISSIMA

Is situated three hundred yards west of the San Nicolas. The vein trends north-west and dips to the west at an angle of seventy degrees.

A tunnel has been run two hundred and fifty feet on vein and in good ore, eight feet wide. Two shafts, now full of water, have been sunk below water level to a depth now unknown.

The vein is enclosed in and conformable with the slate country rock, at this point regular and free from distortion.

DIVINA PROVIDENCIA

Crosses La Purissima and San Nicolas. The vein trends north-west and dips to the east at an angle of forty-five degrees.

A shaft has been sunk sixty feet on vein, and in good ore three to six feet wide.

The formation is similar to that of the preceding mine.

SANTA RITA.

The situation may be seen on reference to accompanying topographical sketch.

Two shafts have been sunk to a total depth of sixty feet on the vein, which is five feet wide, in threads of from six to eight inches, with slate intervening.

The vein is conformable with the slate formation, which, in the neighborhood of mine, is very much distorted.

GUADALUPE

Is situated about eight hundred feet above the preceding mines, a spur from the main range intervening. The vein trends north-east and dips to the east at an angle of seventy-five degrees.

The formation is similar to the veins immediately preceding. A tunnel has been driven three hundred feet on vein, all in strong, rich ore, which looks very well, and altogether this mine is very promising.

REDUCTION WORKS.

The natural location of the reduction works is on the site of the old arastras on the bank of the Rio Chapatuato, where there is abundance of level ground, and wood and water sufficient for any purpose which will be required.

CLIMATE.

Situated six thousand feet above the level of the sea, the climate is excellent, and there is nothing to prevent the prosecution of work at all seasons of the year.

LABOR.

Abundance of excellent labor is to be had in this section of the country at from 37½ to 50 cents per day.

MACHINERY.

All these mines, from the mountainous nature of the country and the deep gorges, are easily accessible to a great depth.

Expensive machinery, ordinarily the first necessity in mining, is in this district entirely unnecessary until a depth of nearly two thousand feet has been reached. Abundance of rich ore lies above the water line, waiting for the hand of the miner, and sufficient in quantity to furnish large outputs for very many years.

SUMMARY.

San Nicolas.—Three tunnels should at once be started to develop this vein, the first a few feet above the bed of the creek, where a large body of ore is now in sight; the second, two hundred and fifty feet vertically above, and the third five hundred feet above the creek. The present works may be continued, but no more sinking allowed. Level drifts passing in on vein rapidly augment the ore overhead from the rise of the mountain.

The other mines should be cleared of debris, and drifting resumed at the most favorable points. There is no reason to doubt that much good ore will be obtained from them at a profit, with ordinary care.

An inclined plane can be cheaply constructed. The nature of the country is very suitable. The loaded cars descending would draw the empty ones from the reduction works to a central point suitable for all the mines.

In making any estimate of the quantity of ore which might reasonably be expected to be mined and reduced, the great width of the San Nicolas would appear to justify very large figures. One hundred tons daily from all these mines would be easily obtained. Endeavoring to guard against all contingencies, and deducting fifty per cent., fifty tons per day will remain as the minimum daily average. Assuming that the cost of reduction and mining be placed at the high rate of $45 per ton, a margin of $30 per ton shows as net profit between working expenses and the estimated average of $75 working value before mentioned. Fifty tons per day, at $30 profit, would show an annual balance of $450,000. Deductions so large have been made on all points bearing on this estimate, that it is probable actual working will prove a greater success than is foreshadowed here. Whatever the amount may be, it is certain, after an examination of the San Nicolas mine and vein, no one can doubt that on the completion of the reduction works, and with good management, dividends very large in amount will be immediately, and for very many years, regularly divisible out of the profits of this exceptionally valuable property.

J. C. SIMPSON.

MICHOACAN SYNDICATE.

"OZUMATLAN."

MICHOACAN,

MEXICO.

NEW YORK OFFICES:

Rooms 55 to 61 Boreel Building, 115 Broadway, New York.

GENERAL AGENT'S OFFICE:

City of Morelia, Mexico.

1881.

EL CARMEN
CARMEN
VEINS
VEINS
500ft
TUXPAN

THE OZUMATLAN GROUP OF MINES

IN THE

STATE OF MICHOACAN, REPUBLIC OF MEXICO.

In the autumn of 1880, Mr. William Denton, a Civil and Mining Engineer of twenty-five years' professional experience in Mexico, visited the mines of Ozumatlan, examined, surveyed and sampled them with great care, and made contracts upon very liberal terms with their owners.

In December last he brought these contracts, with large samples of ores from the various mines, to New York, and brought the matter to the attention of a number of our most successful mining men, who organized upon these contracts the

MICHOACAN SYNDICATE.

This syndicate proceeded at once to send to Mexico several reliable mining engineers, well known to all persons interested in mining, with orders to critically examine the mines and verify the statements of Mr. Denton.

These engineers have now returned, after devoting some two months to the work, and they fully endorse Mr. Denton's statements and opinion, placing a much higher value upon these great properties than Mr. Denton had done, while cutting down their own estimates to the lowest possible point.

Mr. Denton's original report upon the Ozumatlan group is first given below, and followed by the reports and maps of Mr. Arthur D. Foote, M. E., and Mr. Jas. C. Simpson, M. E.

THE OZUMATLAN MINES OF MEXICO.

REPORT OF WM. DENTON, M. E.

The Ozumatlan group of mines, lately contracted for by the Michoacan Syndicate, are situated near the city of Morelia, the capital of the state of Michoacan, about 200 miles west of the city of Mexico. The railway now building between these two points will be completed within a year, and runs within some twelve miles of these mines.

Prior to 1810 they enjoyed a well deserved celebrity, but, as with other mines of Mexico, which the early Spaniards and those who had preceded them turned to such good advantage, wars, rebellions and the general unsettled condition of affairs, with attendant national insecurity, about the date which has been given, put a stop to operations at Ozumatlan, which, at the time of the suspension, was a rich and prosperous mining town, bearing the name of Real.

The mines then abandoned left behind them every indication of extreme productiveness, while documents in further attestation were on record up to 1858, in the Cathedral of the city of Morelia. So rich were the owners, and so lucrative was the working of these mines, that out of the products of this group was presented to the church no less a sum than $4,800,000. The owners had large smelting works, the remains of which are distinctly traceable.

Since 1810, the Spanish mine operators having been either driven out or compelled to relinquish their properties, mining has been at a comparative standstill in this country, the inert Indians and Mexicans having contented themselves with scratching for a mere existence among the debris that men of enterprise had been forced to leave behind them. But all the old miners, successful as they were, went but a short distance below water-mark, and it is well known that, as a rule, in all countries the great mineral wealth lies below that level. This is now being proved in Mexico by the comparatively small works that had been inaugurated.

At Ozumatlan not only are some of the old properties being re-opened, but new ones are being operated with a satisfactory result.

Among the former, some of which were worked in the middle of the eighteenth century, and yielded no less than $30,000,000, are the Guadalupe, San Pedro, La Concepcion, La Purissima, San Cayetano, Santa Anna, San Vicente, El Socoro, and La Providencia. They run nearly parallel, are close together, and are, as before mentioned, rich in mineral.

The San Pedro runs north-east, is three hundred and twenty-eight feet wide, has a nearly perpendicular inclination, has a tunnel of one thousand six hundred and forty feet, and a shaft of one hundred and sixty-four feet.

The main lode of La Concepcion runs north-east, is sixty-six feet wide, is nearly perpendicular in inclination (its smaller vein having a similar course in inclination), has a width of two feet, and a tunnel on the main lode of one hundred and sixty-four feet.

La Purissima also runs in a north-easterly direction, has three shafts, with a total depth of ninety feet. It has a width of surface of six and fifty-six hundredths feet, of ore body of two feet, of vein (at ninety-one feet deep) of thirteen and twelve hundredths feet, and of ore body at the same depth of three and twenty-eight hundredths feet. The ore requires no flux in smelting, and assays from $100 to $1,000 per ton of two thousand pounds. To sink shaft No. 1 any deeper, where the richest ores are of course to be found, would require a pump. This is undoubtedly a regular fissure vein, and is most promising.

San Cayetano runs north-east, is three and fifty hundredths feet wide, runs nearly perpendicularly, and has an inclined shaft and tunnel of one hundred and ninety-seven feet.

Santa Anna runs in the same direction as all the others, has one and sixty-eight hundredths to three and twenty-eight hundredths feet width of vein, runs almost perpendicularly, with a main shaft of two hundred and twenty feet and a tunnel of the same length.

San Vicente runs north-east, has five feet width of vein, is perpendicular in inclination, and produces red and blue ore, which assays high.

El Socoro also runs north-east, is three feet in width of vein, with a tunnel running from east to west, cutting the vein at one hundred and forty feet, from whence goes a shaft of thirty-three feet.

La Providencia is north-east, with three and twenty-eight hundredths feet width of vein, a tunnel of one hundred and sixty-four feet on the vein and a shaft of thirty-three feet.

El Carmen, the new mine, runs north-east, and nearly perpendicularly with a width of vein near the surface of three and twenty-eight hundredths to seven

and thirty-seven hundredths feet. At a point in the lower drift two hundred and seventy feet below the summit of the mountain, and seven feet north of where the drift cuts the vein, it has a width of twenty-one feet of vein matter and six and fifty-six hundredths feet of ore. The main shaft is one hundred and sixty-four feet deep, and the main tunnel, where the shaft enters, has a length of four hundred and ninety-two feet, where it cuts Vetia Santo Nino, a distance of one hundred and one and sixty-eight hundredths feet, and east of the main vein or lode, from the main lode to the Vetia Las Animas, seventy-three and eighty hundredths feet.

For situation this mine cannot be surpassed. The main works are located on the mountain, which, as far as drainage is concerned, overlooks and commands the remainder of the mining country. The mine is the property of Colonel Gonzalez, and is being worked with satisfactory results.

A tunnel could be run into the mountain from the creek, or the tunnel which is being cleared in the Boca de Guadalupe, already fourteen hundred feet long, might be made use of very easily. The proposed new tunnel would leave the apex of the mountain more than fifteen hundred feet above the plane or bed of the tunnel, and not only drain the mines, but would eventually serve, after the main shafts had been brought in connection with it, as the principal road or outlet for securing ores from the various lodes which it crosses. This would render unnecessary the use of much machinery for years to come.

Of course an engine and hoisting apparatus would be required in making the main shafts, which will be from one hundred to fifteen hundred feet deep. But this would be all. The shafts mentioned must be sunk, not only to facilitate the taking out of ores, but to secure ventilation for the main tunnel and side drifts. These latter would vary from three hundred to five hundred feet in length, driven in on vein at every fifty feet in height, and crossing the tunnel according to the allowances and necessities of ventilation. A shaft sunk on each vein to main tunnel would give ample ventilation for a long time to come.

The ores of the Carmen assay:

	Silver.	*Gold.*
Main lode, . . .	$341.26	$6.12
Vetia Santo Nino, . .	43.36	.23
Santa Animas, . .	59.38	4.00

There is thus conclusive proof, from the situation of the mine, the amplitude of its veins and the abundance of its ores, that El Carmen can be worked with less expense than almost any other mine in the district, as it gives a more gene-

rous yield than any property, with the exception of Purissima and Boca de Guadalupe, whose assays are nearly four hundred per cent. greater.

Although Ozumatlan bears evidence of having been worked by men of intelligence and energy, the present owners have neither the necessary enterprise nor appliances, and must, perforce of circumstances, content themselves with grubbing above water level and running their tunnels to drain some of the old mines that are the most elevated, in the vague hope of striking some new lead.

Capital and skill can, without a doubt, produce more than double the amount of ore that has yet been mined. There are brilliant pecuniary successes in the very near future for those who, by proper methods, undertake the further drainage and development of the old mines and opening up of new ones, which will not be by any means an expensive work, as they are so situated that they are self-draining to a depth of one thousand five hundred feet.

The country is well wooded, being amply supplied for centuries. The water supply, moreover, is excellent, a small, rapid river running at the base of the mountain, not only sufficient for all milling purposes, but ample for the driving of powerful machinery. Labor is cheap, costing from twenty-five to fifty cents per day.

The Hacienda's main buildings are, it is true, in ruins, with the exception of those belonging to Col. Gonzalez and the Morelia Mining Company, who are operating, on a small scale, at San Pedro, Concepcion, Boca de Guadalupe and Santa Anna, the result being a small profit that will never be increased as long as the mines are in their hands.

The ores of the group are rich, running from $40 to $1,000 per ton of two thousand pounds. The general formation of the country is slate, porphyry and greenstone. The ore body of the Carmen runs through a soft cement, and I believe Col. Gonzalez has not used powder in his mine, El Carmen. He is no miner, but is making money. He has smelting works on a small scale, with water blast, the whole concern, however, not having cost more than five hundred dollars.

I feel sorry that time and circumstances will not permit me to make a more thorough examination of this notoriously rich district, whose almost fabulous wealth has been continually recorded in the annals of the state, but I have seen sufficient to convince me that capital can find no better field for a lucrative and safe investment than the district of Ozumatlan.

WILLIAM DENTON.

Morelia, August 22, 1880.

To the Trustees of the Michoacan Syndicate, New York:

The following reports of the mining properties of Michoacan, in which you are interested, are respectfully submitted for your consideration.

At your request I left New York on the 6th of January by steamer, and spent over two months in Mexico.

The gentlemen in the cities of Mexico and Morelia connected with your enterprise did everything in their power, not only to facilitate my work at the mines, but also to make my stay in the cities, and my trips through the country, pleasant in every way. Their generous hospitality and kindness was such that one might almost believe the often repeated expression of politeness of the country, "My house and everything that I have are at your disposal," to be literally true.

That I consider the country safe for business may be inferred from the fact that Mrs. Foote accompanied me on the trip, two hundred and fifty miles of which was through the interior, by stage coach one way and on horseback returning.

The southern part of the central plateau of Mexico is, more than half, rich agricultural lands; consequently living is cheap. Labor is plenty and also cheap, miners' wages being thirty-seven and one-half cents per day.

Iron and manufactured articles must be imported and are expensive.

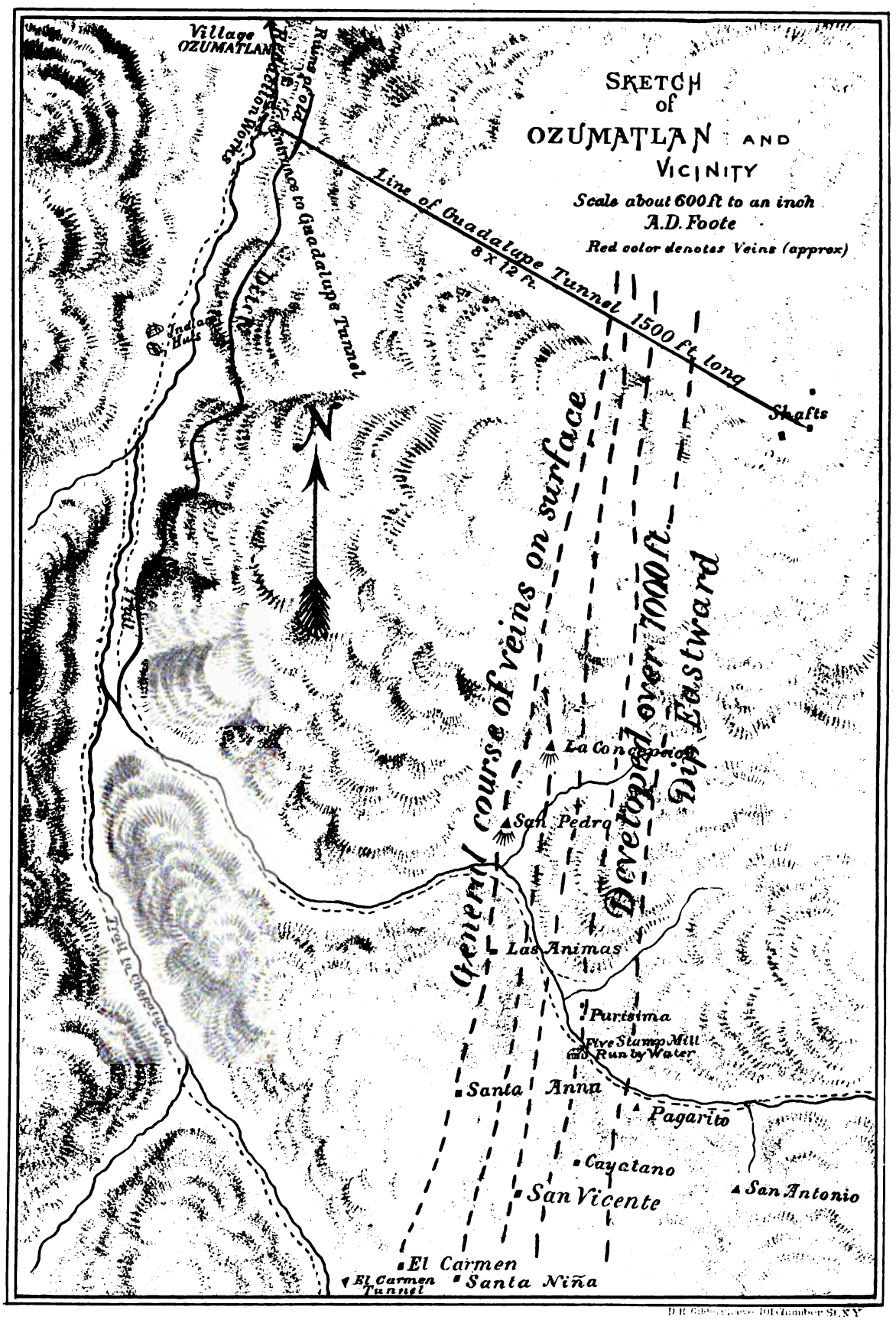
The Mexicans are inferior miners, being small men, and untaught in modern methods of mining; still they are remarkably quick and industrious, and under good foremen these qualities will partially make up for lack of strength and knowledge.

Freight from the city of Mexico is now transported by carts or wagons. From Mr. Kingsley, Chief Engineer of the Morelia division of the railroad, I learned that the road would be running from Morelia to the city of Mexico within twelve months from this date. There are now over three thousand men working at different points on this line. Wood and water near the mines are abundant and the climate nearly perfect.

Very respectfully, your obedient servant,

A. D. FOOTE.

New York, April, 1881.


SKETCH
of
OZUMATLAN AND
VICINITY
Scale about 600 ft to an inch
A.D. Foote
Red color denotes Veins (approx)
Village
OZUMATLAN
Reduction Works
Road to
Line of Guadalupe Tunnel 1500 ft. long
8 x 12 ft.
Shafts
Indian Huts
Mill
Trail to Chapultenango
General course of veins on surface
Developed over 1000 ft.
Dip Eastward
La Concepcion
San Pedro
Las Animas
Purisima
Five Stamp Mill
Run by Water
Santa Anna
Pagarito
Cayetano
San Vicente
San Antonio
El Carmen
El Carmen Tunnel
Santa Niña

REPORT OF A. D. FOOTE, M. E.,

UPON THE MINES OF

THE OZUMATLAN DISTRICT.

This group of mines is situated about thirty miles by wagon road and trail north-east of Morelia. From the nearest point on the wagon road and also the railroad line to the city of Mexico, it is about twelve miles by trail in a southerly direction, through an open rolling country, and it would require not over three thousand dollars to make this trail a good wagon road with easy grades. The question of transportation thus becomes quite a simple one for Ozumatlan.

The country rock around the mines is an immense mass of trachyte, forming hills from a thousand to fifteen hundred feet above the main creek bottom. This is traversed in a north-east and south-west direction by a half dozen or more quartz veins close together, and I think often running into each other; they are nearly perpendicular, are very clearly defined, and usually carry a clay selvage on either side; in other words, they are good examples of true fissure veins. They have been opened or prospected by tunnels and shafts for over seven thousand feet in length. The most northerly point prospected on them is where the Guadalupe tunnel cuts them, at a depth of about a thousand feet below the surface. It was built under the old Spanish rule, and though not quite finished, it is an excellent piece of engineering work, not only in the way it is done, but in its economical aspect. It is fifteen hundred feet long and eight by twelve feet inside. Starting from the old reduction works it runs into the mountain south-easterly and already cuts two of the quartz veins; small branch drifts have been driven along these veins and a little stoping has been done, exposing for two hundred feet a vein of ore about four feet thick, of very high grade. In 1810 the Spaniards were driven away, evidently before they had realized much benefit from the tunnel, and very little has been done since. It is difficult for any one who has not seen the mines to realize the value and importance of this tunnel. It drains the whole district to a depth of from five to fifteen hundred feet, and

enables the ore to be mined in the cheapest possible way from all the mines for three thousand feet at least in one direction, and no one knows how far in the other, because it is not prospected. It brings the ore direct to the reduction works, thus avoiding all other transportation. It has already developed a large body of very rich ore. It will take but a few weeks' time and little money to clean it out, straighten the inner end a little, lay the track, and start stoping on the ore that is already there, while drifting and opening up of more ore is going on at the same time.

I might mention also that it indicates what the former miners thought of the property. I think they were never known to expend so much time and labor as has been expended on this tunnel, unless it would pay.

The tunnel thus being the key to the whole district, the other mines are of comparatively little importance, except so far as they show ore bodies, and prove the value and continuity of the veins. Beginning at the south end of the district (see map), the Carmen mine develops two veins. It has over two thousand feet of workings, a portion of them old and not cleaned out. One vein will average about four feet thick and the other about two. There is an ore body four feet thick and sixty feet long, shown in the floor and roof of the lowest drift; the level above shows it also, and, in fact, all through the mine, where we could go, the veins showed well, the ore pinching out completely in places and then thickening up again. The lower levels have not been stoped much, but the upper and old part appears to have been nearly cleaned out and either filled or caved in to a great extent. A tunnel has been driven from near the level of the creek one hundred and fifty feet into the mountain. This is expected to cut the veins when driven four hundred and fifty feet further, at a depth of six hundred feet below the present workings. A branch from the Guadalupe tunnel, following the vein to this mine, will be at least fifteen hundred feet below the surface. The owner of this property has a rude furnace built of adobe, but is without other machinery. Still he appears to be making money.

The next mine of importance is the Purissima, situated about midway between the Carmen and the Guadalupe, in a gulch, and consequently not very deep (sixty-five feet). It shows a body of very rich ore in the lower drift, about twelve feet thick and thirty feet long. It was said to extend to the level above (thirty-five feet), but I was unable to determine this point. Ore shows well in other places, however, though most of it above has been stoped out. Enough is in sight to prove the body to be large, and taken in connection with the mines around proves the continuity and large size of the vein.

This mine has the only windlass, wheelbarrow or mill that I saw in the Michoacan mines. The windlass required four men to raise about ten gallons of water in a skin bucket. The wheelbarrow, including wheel, was made from boards split and hewn smooth. The five stamps of the mill were of wood, with a thin sheet of wrought iron nailed to the bottom of them, while the mortar was a smooth-faced rock. It was run by water power and worked on the same general principle as the modern stamp mill. I speak of these things simply to show how extremely crude are the appliances for mining in this country.

Of the other mines of the district the Cayetano shows a vein twelve feet thick and is probably the same as the Purissima. The San Pedro and Concepcion are also large and are probably the same as the Carmen. The Santa Anna and Las Animas veins are from four to six feet thick, and the other prospects in the vicinity show veins carrying ore, most of them probably branches from the main ones. The ore carries, besides silver, a little gold, antimony, iron, sulphur and a little lead.

The ruins of the old reduction works show that the furnace and arastra were both used, so that probably there will be no difficulty in amalgamating the ores after roasting.

The old ruins are very extensive, the stone wall now standing that encloses them being an irregular rectangle of about two hundred by eight hundred feet. A part of the main building is still standing. Below these ruins are others with their piles of refuse, showing that great quantities of ore must have been worked here, although the mines are so slightly developed. The ores of this district are of a far higher grade than of any others I saw in Michoacan.

I estimate the average assay value of these ores to be at least two hundred dollars per ton, while selected ore can be raised to from five to eight hundred.

Of the quantity of ore actually in sight, I can make no estimate; I only know that it shows in large quantities and in many places, along several veins near the surface, for a distance of over seven thousand feet. That it extends in depth is indicated by the tunnel, which shows the largest and best body at a thousand feet under the surface.

Perhaps I can explain this matter better by the following statement and calculation:

The veins show large bodies of ore at intervals of seven thousand feet in length.

There is an average of one thousand feet of these veins above the level of the Guadalupe tunnel.

Their thickness, so far as known, averages over four feet.

The assay value of the ore averages about $200 per ton.

Allowing one-half of the length of the vein to be barren, leaving it only thirty-five hundred feet long;

Allowing one-half of the height above the tunnel to be barren, leaving it five hundred feet high;

Allowing one-half of the average thickness to be barren, leaving it two feet thick; and there are still three hundred and fifty thousand tons of ore left.

Allowing this to give a profit of $50 per ton from an assay value of $200, and there is a profit of $17,500,000 standing above the tunnel level.

This would be one-eighth of the estimated size of the vein.

About sixty miles south-east of the mine, at Trojes, are the large reduction works of an English company; the transportation of ore to this point would cost about thirty dollars per ton; working charges about forty dollars. If advisable, therefore, selected ore could be sent to these works for treatment.

Ozumatlan Creek carries about five hundred inches of water in the dry season, which can be easily brought to the old reduction works with a head from three to five hundred feet, thus furnishing all the power needed. Oak and pine timber are plenty in the immediate vicinity. It is but about six miles to the rich valley to the northward, where all food supplies are remarkably cheap. Labor is abundant and worth from twenty-five to forty cents a day, miners averaging thirty-seven and one-half cents.

I would advise the continuation of the Carmen tunnel, as I think it better to reach the ore that way than to wait for a branch from the Guadalupe to reach it. I would also advise the cleaning out and finishing of the Guadalupe tunnel, the starting of drifts each way from the tunnel on the different veins, at the same time stoping overhead; shipping the best ore to Trojes for treatment, until such time as the drifts and stopes showed sufficient ore to keep a mill running, and perhaps also wait for the railroad: then having found the best methods of reducing the ores, erect reduction works where they were before, start mining on a large scale, keeping the prospecting far enough ahead to develop the ore long before it is needed.

In order to carry out this plan of working there should be at least $25,000 working capital in hand. It must be remembered that there is absolutely nothing in the form of tools or machinery in the country. The first thing needed will be lumber for cars, tracks, air boxes, etc., but there is not a board to be had except by hewing it out of a log. A small saw-mill and turbine water-wheel will

supply them very cheaply. Hardware, iron, steel, nails, picks, shovels, carpenters tools, wagons, mules, etc., will have to be procured. A complete assaying outfit is necessary, as there is nothing of the kind nearer than Trojes. It would be advisable also to have American or English foremen, an assayer, a carpenter, and probably a few miners. All of these will be expensive by the time they reach the mines, and it will be several months between their leaving New York and the receipt of returns for ore from Trojes.

A. D. FOOTE.

New York, April, 1881.

REPORT OF J. C. SIMPSON, M. E.,

ON THE MINING DISTRICT OF

OZUMATLAN, STATE OF MICHOACAN, MEXICO.

GEOGRAPHY.

The State of Michoacan lies between the eighteenth and twentieth parallels of north latitude, about two hundred miles west of the city of Mexico. Its capital city is Morelia, an old Spanish town, noted for the elegance of its private residences, and for the hospitality and culture of its inhabitants.

The village of Ozumatlan is situated twenty-four miles north-east of Morelia, at the foot of the hills where the mines hereafter referred to are located. A stage for passengers and mails passes almost daily within ten miles of the village, between the cities of Mexico and Morelia.

RAILROAD.

The building of a railway between the cities of Mexico and Morelia is now being pushed with great vigor. The Mexican National Construction Company (Palmer & Sullivan, 17 Cortlandt St., N. Y.) have a force estimated at 10,000 men grading at various points on this main line. The energy with which the work is being prosecuted renders probable their confident expectation that the whole line will be completed and in running order within the next eighteen months.

This road passes within eight or ten miles of Ozumatlan. The intervening country is naturally adapted to the cheap construction either of a branch railway or of a good wagon road, with easy grades.

HISTORY.

The mining village of Ozumatlan was founded by the Spaniards about the end of the seventeenth century. It had its origin evidently in the wealth of the surrounding mines, which, even at that early date, were extensively and profitably worked. Traces are everywhere visible of the magnitude of these operations. This fact in itself is sufficient to entitle the district to a careful study of the

LONGITUDINAL SECTION

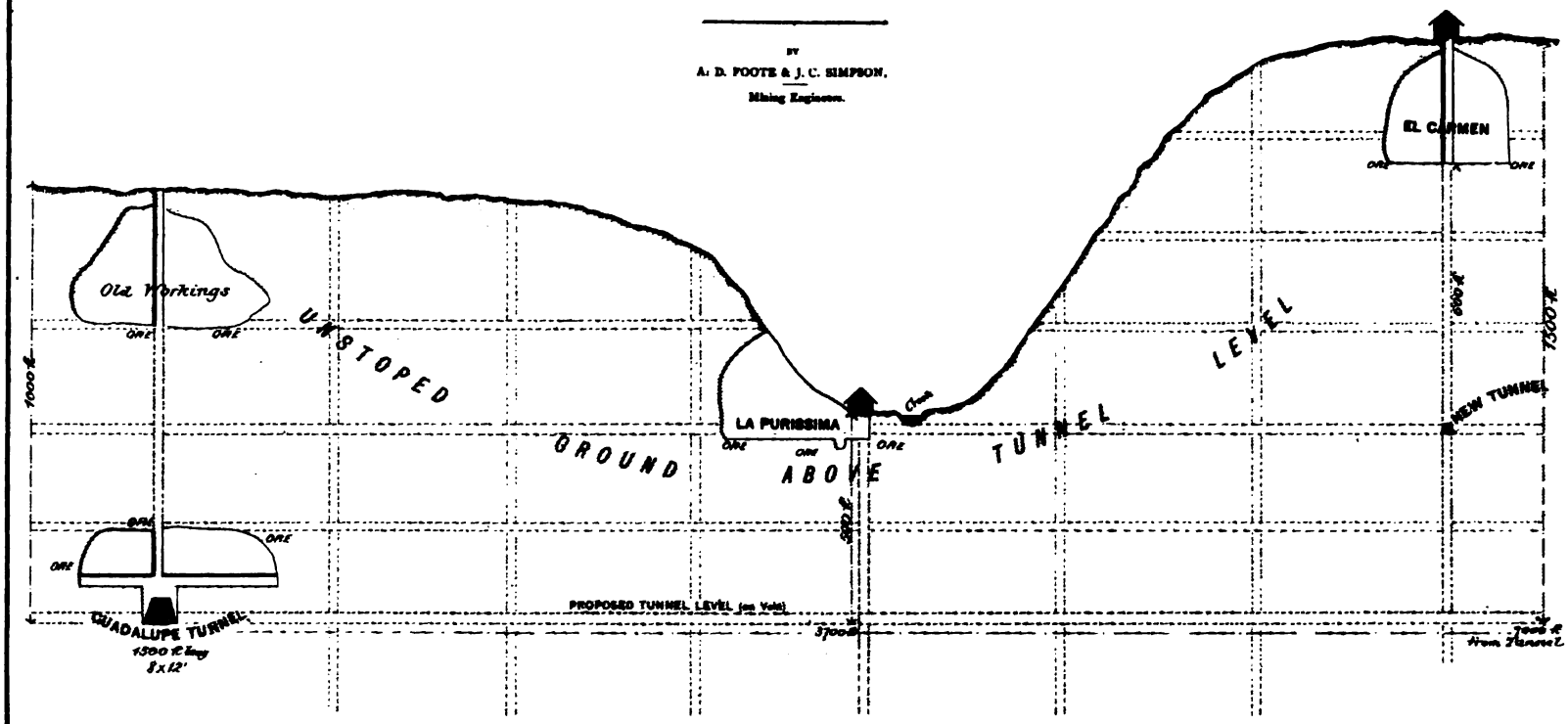
OF

OZUMATLAN

BY

A. D. FOOTE & J. C. SIMPSON,

Mining Engineers.



resources which impelled them to undertake such extensive works of development. Their well known mining skill, even with the crude appliances of that age, was never wasted upon unprofitable fields of labor, and the evidences of large and long continued work which yet exist, taken in conjunction with the parish records, prove incontestably that they found here a district which amply rewarded their toil.

Since the expulsion of the Spaniards in the early part of this century but little has been done in prosecuting their work. Both skill and capital went with them, and the inhabitants have been content to work over and over the debris which remained on the various dumps.

The greater part of the village is now in ruins. A strong stone wall, ten feet high, enclosing the ancient reduction works, still stands untouched. The interior space is about one thousand by one hundred feet. The arastras and furnaces can be easily found, and the large heaps of slag near the latter attest their success in smelting. In the centre of the inclosure is a massive building, which contained the offices and storerooms, and which, with a little expense, can be made as strong and useful as ever.

GUADALUPE.

Starting from the centre of the old works just described, a tunnel twelve feet wide and eight feet high has been cut through trachyte, the country rock. Its obvious object was to intersect the lodes whose outcrops are visible on the summit of the mountains, as shown in the accompanying topographical sketch, and to drain them to the lowest point in the valley.

In this tunnel both grade and line have been carefully preserved. The water has just sufficient fall, no level is lost throughout, and the whole work is executed in an admirable manner.

For the scientific development of this district this tunnel is an absolute necessity. The advantage of finding it completed, as it now stands, may be judged from the fact that an expenditure of $70,000 and three years' time would now be required to execute the work.

At eight hundred and twelve hundred feet from the mouth of the tunnel two veins are cross-cut. They have been drifted upon, but are now filled with debris and inaccessible. At fifteen hundred feet from its mouth the tunnel intersects the Guadalupe vein. No one can examine the width of this vein and the quality of its ore without being convinced that the time and labor spent in reaching it were abundantly rewarded.

The lode trends north twenty degrees east and dips at an angle of seventy-five degrees to the west. The gangue is quartz, and the ore carries silver largely, a trace of gold, five per cent. of lead, and three per cent. of antimony, sulphur and iron.

At the point of intersection, and for two hundred feet on the vein and fifty feet above the tunnel, its width is from twelve to fifteen feet. The ore averages five feet wide. There is no reason to doubt that this width is sustained over a much larger area, but the lack of ventilation prevented a further examination. Within the area given above the vein remains unstoped, only the galleries having been driven.

After careful investigation and assay of the ore here visible, and after making large discounts and allowances, I estimate its average value to exceed $200 per ton. Ordinary specimens which I have had assayed run over $800 per ton, and below the level of the tunnel it is reasonable to suppose that the grade of ore will be higher than in the upper works.

Only a few days' time would be necessary to lay a tramway in the tunnel. Immediately on its completion the output of ore could be commenced, and at the end of three months, with a reasonable energy, one hundred tons daily could easily be attained. Operations were originally commenced on the summit of the range, one thousand feet above the tunnel level. They were evidently continued until the demonstrated value of the vein justified the great work of pushing the tunnel. It is not known whether the lower workings have met the developments from above, nor is it material to the future of this mine whether they have or not. A great lode of very high grade ore, of unusual width and continuity, abundantly proven by many developments, undoubtedly exists here, and even at the tunnel level it is sufficient to produce an immense output and to last for many years.

Whenever it may be desired to sink below the present level, an excellent opportunity will be afforded to pump the water with hydraulic power by collecting, at a higher level, a portion of the large quantity which now finds its way out of the tunnel, thus avoiding the necessity of costly steam power. Transportation of the ore to the dump could be cheaply and readily effected by the application of the same power.

It may not be uninteresting to relate that the tunnel seems to continue beyond the Guadalupe, but that we were unable to penetrate further, as the debris had not been cleared.

LA PURISSIMA.

This mine is situated three-fourths of a mile south of the Guadalupe, and is probably a part of the same lode at the point where it reaches the valley and

crosses the creek, as shown in topographical sketch appended hereto. The lode trends north twenty degrees east, and dips to the east at an angle of seventy-five degrees.

The development of this mine has been by three shafts. The first is from the surface, and at a depth of thirty feet a drift has been run on the vein. A new shaft reaches a sixty-foot level, and a third shaft reaches from this to the lowest level, which is ninety feet from the surface. All of these workings are below the level of the creek. At the sixty-foot level the drift has been cleared for two hundred and fifty feet, and is all in good ore. On the lowest level forty feet of drifting has been done, and the work is now proceeding with excellent appearances of strong ore. It is safe to give the vein an average width of ten feet.

From the assays of ore taken from this mine, it is a conservative estimate to place the average yield at over $100 to the ton. Some samples of the ore, far from being the best, run considerably over $200 per ton—gold $153, silver $59, and two and three-eighths per cent. antimony.

Throughout these workings the appearances are of the most assuring character. There can scarcely be a doubt that only depth of development is needed to bring the average up to double the figures above given.

For the proper working of this mine, a pump would be required from the first, though the quantity of water is inconsiderable. At present manual labor on a windlass with small raw-hide buckets is the only method in use. With modern machinery and intelligent mining work, a large output of high grade ore could be secured and maintained for a long period.

The lode on which the Purissima is located forms one of four or five parallel veins crossing the valley at this point. They are not more than 200 feet apart. Upon these veins are located mines bearing the following names: San Cayetano, San Vicente, Don Pedro, Concepcion, Santa Anna, Las Animas. Tunnels have been driven from the level of the creek to intersect and drain these mines, and they have for the most part been worked down to the water line, but have now caved in, and investigation as to their character and value is thereby rendered impracticable. In some of these mines, shafts have been sunk below the water line, and are of course now full of water. In order to prosecute the work, pumps would be necessary. It is a reasonable presumption that these upper workings proved profitable or they would not have been executed so extensively. With modern skill and appliances I have little doubt that deeper development would produce gratifying returns.

San Vicente at its outcrop is an exceedingly strong vein, with an average width of fifteen feet.

EL CARMEN

Is situated half a mile south of the Purissima, a mountain about one thousand feet in height intervening, and is close to the second creek shown on the topographical sketch.

A tunnel has been driven into the side of the hill, intersecting the vein at a depth of three hundred feet from the summit. The workings from this tunnel have apparently been extensive, but the drifts are now mostly filled with debris. About one hundred and fifty feet on the vein has lately been cleared, and discloses throughout the entire distance a very fine looking body of ore. The vein possesses an average width of seven feet at this depth, and assays of the ore justify me in placing its value at not less than $75 per ton, principally in silver.

Recently a new tunnel has been started at the level of the creek, intended to cross-cut the vein at a lower point. This tunnel is now in one hundred and fifty feet. At a distance of four hundred feet further, it will intersect the vein, six hundred and fifty feet below the old workings, and will undoubtedly open up an enormous quantity of rich ore, free from water and easy of access.

El Carmen is a very valuable property. It is located upon the same lode as the Purissima and the Guadalupe, and at the same level as the workings of these mines will probably show equal strength and value. It will require the expenditure of but a small amount of money to reach this vein at a point one thousand feet below its outcroppings; and the evidence of its value, which the upper workings afford, leaves no room to doubt that such further development will prove it to be one of the richest of the Ozumatlan group.

Col. Gonzalez, the owner of El Carmen, a man of great ability, and the leading citizen of Ozumatlan, has been of late years working this mine in a small way, and although inexperienced in mining, has been making money from his work. Of course his profits are limited by the imperfect appliances which he possesses, his smelting works being rigged in a very primitive way.

WOOD.

A supply of cheap fuel is one of the most important features of a mining district, and in this respect Ozumatlan is especially fortunate. The surrounding country is covered with a heavy growth of pine and oak, sufficient for all purposes for many years to come. Wood can be delivered at the mines for less than $3.50 per cord.

WATER.

At all seasons of the year there is an abundant supply of water. A creek, which rarely falls below six thousand gallons per minute, passes close to the old reduction works of the Guadalupe, and is contiguous to both the Purissima and El Carmen.

CLIMATE.

Ozumatlan is situated about nine thousand feet above the level of the sea, and possesses a climate noted for its salubrity. It is neither warm in summer nor cold in winter, and throughout the year there is nothing to interfere with the continuous prosecution of mining work.

LABOR.

The labor question, ordinarily a question of considerable difficulty in mining, is, in Michoacan, easily solved. The natives are a very hard working and peaceable people, and, with a few experienced miners to instruct them in the proper methods of working, they would soon equal any laborers in the world. This is the universal testimony of those who have had occasion to avail themselves of native labor. Wages are exceedingly moderate, and from 37½ to 50 cents per day will command an abundant supply of the best workers in the district.

TRANSPORTATION.

A wagon road should be constructed from the mines to the stage road. The distance is only eight to ten miles, and such a road would probably cost not more than $2,000, as the intervening country is very suitable for the purpose. A great part of the distance would require scarcely any work. This road would open up transportation to the large smelting establishment known as the Trojes Works. The distance to these works from Ozumatlan is probably about sixty miles in a straight line, but the circuitous route of the stage road might lengthen it to near one hundred miles. Ore could be transported in wagons in three days at the outside, and at a cost not exceeding $35 per ton. Of course, this method of reaching reduction would be only a temporary device, pending the completion of the railroad, or until the erection of suitable works at Ozumatlan.

RESULTS OF MINING.

From the Guadalupe mine, with its tunnel already complete, its ore in sight, its galleries driven and its ventilation easily to be perfected, it seems safe to calculate that, with ordinary vigor, an average output of one hundred tons daily

ought to be secured during the first year's operations. The deficiency of the workings during the first half of the year, would be fully compensated by the surplus of the later output after the facilities required had reached completion. Assuming that only one-quarter of this amount should be actually mined, that no better resort for reduction existed than by transportation to the Trojes Works, that one-half of its average value ($200 per ton) should be exhausted in mining, carriage and reduction, and still the handsome sum of $750,000 would remain as the net result of the work of the first year. This computation is made upon a basis so conservative, and with allowances for contingencies so ample, that it can hardly be regarded as a sanguine estimate.

La Purissima and El Carmen would require more preliminary work, and would suffer more greatly from the want of a smelter at hand, by reason of the somewhat lower grade of ore at their present stage of development. But even these mines could make a very large profit by the shipment of their selected ores to Trojes, and that profit would become enormous with the construction of reduction works in their own vicinity.

In view of the facts set forth in this report, I have no hesitation in advising the Michoacan Syndicate to carry out their contracts for the mines of this district. They possess the following rare advantages:

1st. They are developed mines with large bodies of rich ore in sight.

2d. They are demonstrated to have strong veins from seven to fifteen feet in width, carrying ore which averages from $75 to $200 per ton.

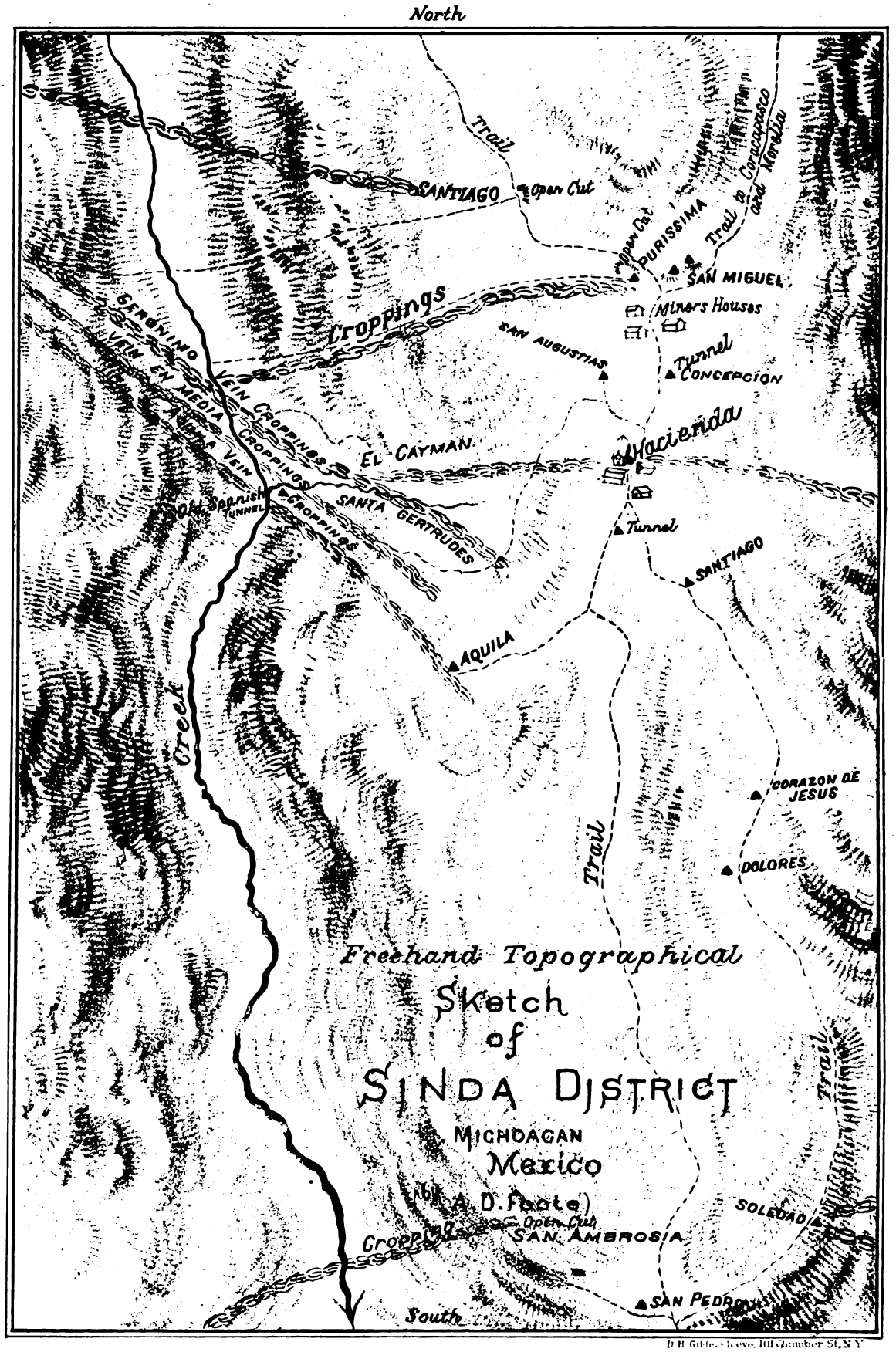
3d. The climate permits work continuously throughout the year.

4th. Labor can be obtained at the exceptionally low price of 37½ to 50 cents per day.

5th. Authentic records exist of vast amounts of ore extracted by crude methods, up to the expulsion of their owners from the country.

6th. A large portion of the necessary work of development has already been completed and is available at the present time.

J. C. SIMPSON.



D H Gilder, Engr. 101 Chamber St, N Y

MICHOACAN SYNDICATE.

PART 3.

"SINDA"

GROUP OF UNDEVELOPED MINES,

MICHOACAN,

MEXICO.

NEW YORK OFFICES:

Rooms 55 to 61 Boreel Building, 115 Broadway, New York.

GENERAL AGENTS OFFICE:

City of Morelia, Mexico.

1881.

THE SINDA GROUP OF MINES,

IN THE

STATE OF MICHOACAN, REPUBLIC OF MEXICO.

In the autumn of 1880, Mr. William Denton, a Civil and Mining Engineer of twenty-five years' professional experience in Mexico, visited the mines of Sinda, examined, surveyed and sampled them with great care, and made contracts upon very liberal terms with their owners.

In December last he brought these contracts, with large samples of ores from the various mines, to New York, and brought the matter to the attention of a number of our most successful mining men, who organized upon these contracts the

MICHOACAN SYNDICATE.

This Syndicate proceeded at once to send to Mexico reliable Mining Engineers, well known to all persons interested in mining, with orders to critically examine the mines and verify the statements of Mr. Denton.

These Engineers have returned, and the reports, with map, are submitted.

REPORT OF WM. DENTON, M. E.,

ON

SINDA.

MORELIA, MICHOACAN, Mexico, August 20th, 1880.

These mines, rich in gold and silver, are some thirty odd miles south-east of the city of Morelia, in the State of Michoacan. The course of their main ridge is north-east, the height of the ridge above the gorge being from fifteen hundred to two thousand feet. The general formation is cement, strongly impregnated with iron, porphyry, schist and a species of sandstone. The surface is red earth and clay, showing quartz in many places.

The mines consist of La Cortadura, San Francisco, San Juan Bautista, Aguila, La Concepcion, San Rafael, Los Dolores, La Soledad, El Carmen, La Purisima, Santa Lucia, Las Angustias, San Geronimo, Cayman, Corazon de Jesus, San Antonio, Lozano, the Gallo, and the Sierra Nevada.

In this group, there are ore bodies—principally gold, in immense quantities —which cannot be worked out in centuries, with wood, timber, water, fine agricultural soil, a healthy climate, and in fact everything except energy and capital to produce grand results.

La Purisima has a very extensive deposit of ferruginous matter running from $15 to $2,000 per ton of 2,000 lbs. Its open cut reminds one of the leaf of a prickly pear or cabbage without the pulp, and though it shows no formal vein on the surface at, say, 20 meters, there must be struck the normal veins which run up the south-west slope of the mountain, and show themselves within sixty meters of the ferruginous matter styled here the sap or flower of the main veins. A considerable amount of superficial labor has been done on these claims, the results having proved satisfactory. The prospectors are developing the property by shafts and tunnels that have shown the threads to have increased from a mere nothing to a width of from 17 to 36 inches of very rich ferruginous matter strongly impregnated with gold. The fibers all concentrate to a common focus, or spring from a common trunk.

The entire depth of the workings of the mine in its shafts from surface and tunnels is 78.72 feet. I feel satisfied, at 120 feet in depth from the level of their present tunnel, they will not only strike the large fissure veins that cut the ridge, but will come in contact with an immense deposit of ferruginous auriferous matter that will yield the prospectors a rich harvest, and create one of the great bonanzas of the time. The property is indeed valuable; it simply requires energy, capital, economy and intelligence to prove in the near future that results have sustained my asssertions. There is plenty of timber (pine, oak, &c.) on the spot, also water power near by for driving machinery on an extensive scale. As I before said, the depth of the mine at the time of my visit was 78.72 feet; the length of tunnels being 383.76 feet.

La Cortadura has a course 30 degrees east, and runs through cement and porphyry, with a nearly perpendicular inclination. The length of the incline and tunnel is 36 feet. The assay obtained simply by pulverizing and washing is excellent.

The San Antonio is situated about 200 meters south of the Cortadura, and has a shaft and tunnel, although the main works are in a large open cut or excavation. The veins or threads of paying ore lie nearly parallel with the horizon, and are imbedded in soft cement. The general formation is cement and porphyry, and the mine intelligently worked would, I have no doubt, pay the operator. The owner of this mine, Don Francisco Lamas, has erected houses, arrastras, &c., a short distance from the mine, which is not now working on account of private disagreements.

The Santa Lucia is of a like character with the San Antonio—in fact, is a continuation of it. Aside from soft, rich deposits, which run from $100 to $2,000 per ton of 2,000 pounds, the Santa Lucia shows one or more formal lodes of rich ore. One of them was worked by the Spaniards up to the time of their expulsion in 1810, when, previous to their departure, they filled up their mines. Another lode was discovered in my presence, in the soft deposit of cement, "open cut," at a depth from the surface of about 20 feet. The course of the lode is north-east and south-west. The width of the vein on the top is 2.50 feet. The dip is nearly perpendicular, and the assay is high.

The Aguila may be thus described: two veins or bluffs of ore matter come together on the apex of a hill, having deep gorges on both ends. One of the veins runs to the north, the other north-west. The vein running due north I believe to be the main lode, although the other looks remarkably well. The north

vein or bluff shows good paying ore in abundance at 100 feet below the summit, and has a breast of ore matter 4 meters in width. A tunnel can be run on the vein from the north 800 feet below the summit of the ridge. The mine as at present worked yields a good sample of ore.

The San Geronimo lies south-west of the Purisima, in the deep gorge which forms the ridge, where the majority of the mines are situated. It is from 1,500 to 2,000 feet below the workings of the Purisima. The ore contains gold and silver. In pulverizing and washing with water it shows a fair percentage of gold. Its course is north-west and dip south. The inclination is 60 degrees, and width of vein 5 feet. The width of solid ore in vein is 22 inches.

El Cayman is a silver mine, and lies 50 feet south of the San Geronimo. Its course is east and west, its inclination 60 degrees, its dip north, with a width of vein of 6.50 feet, and a width of ore of 3.28 feet.

San Francisco has a north-easterly course, with a northerly dip, and has an immense width of gold, with threads dispersed through it in various directions.

The course of the San Juan Bautista is east and west, with a dip to the south. The vein is 15 feet wide on the top. The croppings are well defined with various colored ores. A tunnel can readily be run on the vein 900 feet below the apex of the mountain.

La Concepcion has a tunnel running nearly on the line of the claim, having a surface of twenty feet overhead. The shows of gold are threads running north. The ores are irregular and variegated in color. The general formation is cement and porphyry, strongly impregnated with lime and iron.

Las Angustias is situated south-west of the Concepcion. Its formation is cement, interspersed with ferruginous gold-bearing veins. Gold is in sight, yields well and looks well. The tunnel of 15 feet shows a "manta" of ore from 12 to 18 inches in width.

The San Rafael is a large vein with rich threads of ore, not sufficiently developed to make further comment.

The Los Dolores runs north-east and south-west. It is well defined, with a dip to the north, and an inclination of 60 degrees. The width of the vein is 2 meters, and the width of ore 1 meter. The vein is inclosed in cement and porphyry. The tunnel is 20 meters long, cutting in its course another vein.

La Soledad has a course north-east and south-west. At the working shaft the vein divides, one branch running due east. The inclination of the north-east vein is 65 degrees, and the dip northerly. The width of vein on the croppings

and for 30 feet is 4 feet. The general formation is clay and cement, strongly impregnated with iron. At 30 feet the works enter a crust of ferruginous matter, strongly impregnated with gold. The width of iron crust is 3 feet.

The Corazon de Jesus is in the immediate vicinity of the Soledad, and in its course cuts that vein about the centre of the claim. Its course is north-east, its inclination 50 to 60 degrees, and its dip west.

The San Ambrosio is a bold vein, showing its croppings in the form of a bold bluff 75 feet in width. I gave this bluff a fair test by blasting and water assay with very good results. The inclination is 87 degrees, dip southerly.

The Carmen is a silver mine, situated about 30 meters west of the intersection of the north-west vein of the Aguila and gorge. The tunnel of the Carmen runs south into the mountain 40 meters. At a distance of 300 meters the tunnel will have a covering overhead of 900 feet.

The Gallo is gold, worked to a small extent, or I might say simply prospected. It is a short distance east from the Dolores. To the north of this group and adjoining country, a formation composed of cement, porphyry, a species of variegated sandstone, quartz and gravel appears in abundance, giving further evidence of its being a gold-bearing country.

The Lozano (silver), is in the Barranca or gorge known as the Pilas, three miles south of Sinda. Its course is east and west. Its inclination is 85 degrees, its dip northerly, its width of vein is 10 feet, containing five well developed threads of ore. Veins showing well defined croppings are interspersed in every direction. There is, I may repeat, sufficient water in the vicinity for gold washing and melting purposes, with wood and timber that cannot be exhausted in centuries; and at a distance of 18 miles from Sinda there can be obtained, at little cost, sufficient water to drive machinery of three hundred horse-power.

WM. DENTON.

MORELIA, MICHOACAN, MEXICO,
August 20th, 1880.

THE MICHOACAN SYNDICATE, New York, April 18th, 1881.
115 Broadway, New York.

Gentlemen :

In accordance with instructions received from you in January, I have visited and examined the Michoacan Mines, Mexico.

Herewith please find reports on the three districts in which you are interested, and to which my attention was directed during my three months' absence.

Very respectfully,

J. C. SIMPSON.

REPORT OF J. C. SIMPSON, M. E.,

ON THE MINING DISTRICT OF

SINDA, MICHOACAN, MEXICO.

The mining village of Sinda is situated 30 miles south-east of the city of Morelia, on the summit of a range having a course of north 10 degrees west. Its summit is 8,000 feet above level of the sea, and 1,500 feet above the valleys on either side.

The surrounding country is thickly covered with pine and other timber of the temperate zone. The climate is healthy and agreeable.

The country rock is porphyry, of which there seems to be a vast deposit or zone passing through the country for several miles. Over a distance of at least three miles this formation carries innumerable veins or threads of ore, carrying iron, gold and sulphur. These veins are of varying width up to two feet and of uncertain value. The gangue of all is quartz.

The mines hereafter referred to are situated over an area of one mile in length by half a mile in width, in the centre, lengthways of the zone above mentioned.

La Purisima, San Miguel, Santiago, Concepcion, Corazon de Jesus, Dolores, San Ambrosio, and several other mines, are all situated on the side of a mountain from 300 to 500 feet from the summit all along both sides of range.

The character of veins, formation and extent of development, are practically alike, and it is not necessary to speak separately of them.

The development for the most part consists of tunnels from which short shafts have been sunk, and a total depth of from thirty to one hundred feet attained. The work is fairly well executed, having been done within the past three years.

The mines have been started at the various points where a more than usually promising thread outcropped, which was then followed in whatever direction it might take.

The San Miguel is reached by a shaft thirty feet in depth, from which levels have been branched both ways, showing over three hundred feet on vein. The ore averages eighteen inches wide, and is regular throughout the distance above mentioned. Two shafts are in course of sinking from the thirty foot level, one of which has attained a depth of thirty feet, and a new level is being branched. The vein fully maintains the width of upper level. The average value may be taken at $25 per ton.

On the western slope, and about 700 hundred feet lower, while the formation remains the same, the character of the threads change.

Several fairly defined veins are here seen crossing the range, in one of which is the Cayman mine, and another the Santa Gertrudes. These two as well as the after-mentioned mines are the work of the Spaniards, and are now only being cleaned out.

These two veins, and another which is called the Aguila, have nearly parallel courses, well defined croppings, and can readily be traced for nearly two miles, where they unite. All cross the creek in the foot of gorge, 700 feet below, and within 70 yards of each other. At this point they are called the Geronimo, Veta en Media and Aguila.

Between the two last named a tunnel has been cut 30 yards parallel with their course, and then branched both ways, evidently with the intention of cross-cutting them all at probably 70 feet depth from surface. The work has, however, not been completed; 25 yards of tunnel in each yet remains to be done.

Although the development here mentioned would, in the event of resuming work, be available, still it gives no assistance to forming a reliable opinion as to the veins. Specimens taken from the croppings in the bed of the creek show $9 per ton in gold. No opportunity of obtaining samples at any depth could be found.

The future of this district will depend upon the value of the veins last men-

tioned. Considerable importance should be attached to the existence of the innumerable threads on the upper part of the range. No more favorable indication could be found as to the probability of rich veins at greater depth.

J. C. SIMPSON, M. E.

CERTIFICATES OF ASSAY.

WALTER HAMILTON, *Mineralogist and Assayer.*

NEW YORK, April 7th, 1881.

DESCRIPTION.	METAL.	Weight of Metal per Ton of 2000 lbs.	Value in Coin per Ton.	TOTAL.
		oz. dwts.		
El Carmen of Sinda.....	Silver.....	65 15	$74 95½	$87 38½
		dwts. grs.		
	Gold.....	3 8	3 43½	
	Antimony...	3¼ %, 75 lbs.	9 00	

WALTER HAMILTON, *Assayer.*

NEW YORK METALLURGICAL WORKS.

MATHEY, KUSTEL & RIOTTE, *Metallurgists.*

NEW YORK, May 13th, 1881.

MEMORANDUM OF ASSAY OF ORES.

DESCRIPTION.	Weight Gold per Ton.	Weight Silver per Ton.	Gold Value per Ton 2000 lbs.	Silver Value per Ton 2000 lbs.	TOTAL VALUE.
		oz.			
Santa Gertrudes of Sinda	.....	34 03	. . . .	$44 00	$ 44 00
La Purisima of Sinda, No. 1, 45 feet depth. Average of all samples .	6 68	.....	$138 19	.....	138 19
La Purisima of Sinda, No. 2, 60 feet depth	38 76	43 14	801 36	54 36	855 72
Aguila of Sinda, N. W. vein from gorge, 2000 feet below Purisima.....	.....	24 03	.....	31 42	31 42

Very respectfully,

MATHEY, KUSTEL & RIOTTE.

MICHOACAN SYNDICATE.

PART 4.

"BANCOS DE ORO,"

(PROSPECTS,)

MICHOACAN,

MEXICO.

NEW YORK OFFICES:

Rooms 55 to 61 Boreel Building, 115 Broadway, New York.

GENERAL AGENT'S OFFICE:

City of Morelia, Mexico.

1881.

THE BANCOS DE ORO DEPOSITS,

AND THE

"TZITZIO" VEINS OF GOLD AND SILVER,

IN THE

STATE OF MICHOACAN, REPUBLIC OF MEXICO.

In the spring of 1880, Mr. William Denton, Civil and Mining Engineer, made a preliminary examination of the deposits of free gold-bearing decomposed quartz near Morelia, and of the gold and silver veins in the district of Tzitzio, and obtained favorable options upon a large number of properties, which contracts he has conveyed to the

MICHOACAN SYNDICATE.

These properties have not as yet been examined by the special experts of the Syndicate, but will receive attention in due time. The assays of the samples brought to New York are very satisfactory, in view of the low cost of mining and treating the decomposed material.

Mr. Denton's notes of his reconnoissance of these districts are as follows:

NOTES

ON THE

BANCOS DE ORO DEPOSITS.

BY

WILLIAM DENTON, M. E.

MORELIA, Mexico, April 5th, 1881.

While on my return from my first examination of the gold-bearing district of Sinda, a year ago, my attention was arrested by the very peculiar formation of the country at a place called Tiquio, some three leagues eastward of Morelia. I was at once forcibly reminded of certain gold-bearing districts in California, where during the period of the great gold fever it was my lot to be engaged in mining work.

I made only a hasty examination, owing to lack of time, but took a number of specimens from different parts of the surface of the material, which I had assayed after my arrival at Morelia, and found the results were eminently satisfactory.

I then had to go to the Pacific coast, on an exploring expedition of the mineral regions of the southern part of the State of Michoacan, on which service some five months were consumed, and upon my return to Morelia I found that Don Pedro Gutierrez had returns from the residue of my specimens left at his place, yielding him a button of gold, which, if duly calculated, would give a result of hundreds of dollars of gold per ton of ore.

With this evidence that these beds were worthy of investigation, Señor Gutierrez joined me in forming a party of exploration, and in the month of January, 1881, we set out, provided with the necessary implements, and made a

thorough reconnoissance of the east line of the deposit, and the assays made from the lines of pits gave us a result of an average value of $112.00 per ton of free gold.

(Map not yet printed.)

The pits from which these specimens were taken were made by my men under my direct supervision. I personally selected a fair average of the earth from each, and all the assays were made in my presence. According to my judgment, the prospecting was done with entire fairness, and I gave to the matter the careful attention and impartial justice which its importance merited.

We have already located and entered five Company claims of 2,400 x 600 feet each.

(Map not yet printed.)

The formation of this deposit or belt is decomposed quartz, of greatly diversified colors, and strongly impregnated with iron. The country in the vicinity is well and abundantly wooded with both material for heavy timber and for fuel, and a water supply amply sufficient for working this ore during the greater part of the year. It only requires that the feeders of the streams that pass this locality should be opened and cleared, in order to give an abundant and sufficient supply of water for the reducing works throughout the entire year.

On my arrival in New York, I shall be able to lay before you and your friends such convincing and satisfactory evidence, that I trust you will see that there is no opportunity for making any mistake in this matter, and I suggest to you that no time should be lost in taking the necessary steps to bring both capital and labor into an energetic development of this rich property.

Very truly yours,

WM. DENTON.

NOTES ON VEINS OF GOLD AND SILVER

IN TZITZIO AND VICINITY,

About Forty Miles East of Morelia, and Ten Miles West of Chapatuato,

State of Michoacan, Mexico.

BY

WM. DENTON, M. E.

The vein known as

LA TRONCHA

Is situated about one league (three miles) to the east from Tzitzio, on the Patambaro river.

The course of the vein is north and south, with an inclination of fifty degrees, the dip being east, and the width of the vein thirty-nine feet.

The width of the ore is eight and a half feet. There is a tunnel on the vein of sixty feet in length.

The country is composed of rock slate and quartz; there is an abundance of wood for fuel and of large timber for building and shoring uses, an ample water power, and all other elements necessary to a full development of this property.

(Map not yet printed.)

THE SAN LUIS

Is another vein situated about three and a half leagues (ten and a half miles) to the south of Tzitzio.

Here we find the course of the vein to be north and south, and the inclination nearly perpendicular. The width of this vein is ten and a half feet. The country rock is slate, porphyry and quartz.

As to wood, timber and water, the same conditions prevail, and all are found in great abundance in the immediate vicinity of the vein.

(Map not yet printed.)

A vein called

LA UNION

Is situated some two leagues (six miles) west of Chapatuato, and nearly the same distance to the east of Tzitzio. The course of this vein is east and west, with a width of nine feet, and strongly impregnated with both silver and gold.

LOS MAGUEYES

Is a gold vein, the property of Messrs. M. & S. Vallejo.

The course of this vein is east and west; its inclination is perpendicular, and the width of the vein is nine feet, with an ore width of six feet.

On the spot there is a bountiful supply of water, wood and large timber; labor is cheap, and everything else in proportion.

With an abundance of rich ore, there is no reason why the owners of this property should not receive an ample return for their labor and investment.

(Map not yet printed.)

WM. DENTON.

MORELIA, Mexico, April 5th, 1881.

The New-York Times, Sunday, November 20, 1881.

OUR PROMINENT MINES.

SERIES III.

MINING IN MEXICO.

The land of the Montezumas is attracting the attention of capitalists from all over the civilized world. A nation that has suffered by misrule for so many years is now governed by men of progressive intelligence, who are throwing open their country to internal improvements, inviting men of enterprise and capital to avail themselves of her material resources, of which no nation on earth is blessed with to so great an extent. In no portion of the North American continent does there exist such wealth in mineral resources as in Mexico, notwithstanding the richness of the mines in our States and Territories. Enterprising men with brains and capital are opening up this hitherto neglected country, in the construction of railroads and telegraphing, building up her manufactures and shipping, and chiefly in developing her historical storehouses of the precious metals. The traditional product of her mines is stimulating foreign capital, and it will not be long before Mexico will again be at the very head of the bullion producers of the earth. The number of great undertakings centring in that country is daily increasing, the greatest activity being in mining. The country is known to be intrinsically the richest land in the precious metals on the face of the globe. A country which, by the rudest methods, has produced over *six thousand millions of dollars* since 1535 is unquestionably one deserving of the attention that our prominent mining men and capitalists are now giving it. The most important and praiseworthy of these enterprises is that of the

MICHOACAN SYNDICATE,

which is pre-eminently the greatest mining enterprise of the day. Before a share of this stock was issued the promoters caused a most thorough examination to be

made by competent experts under the syndicate's direction, whose reports were so clearly and satisfactorily presented that the first allotment of the syndicate stock was at once largely over-subscribed for. The organization was formed for the purpose of providing the means for actively working and developing the mines under their control, consisting of valuable groups of gold and silver mines in the old mining districts of Chapatuato, Ozumatlan, and Sinda, all within 40 miles of Morelia, the capital of the State of Michoacan, Mexico, and 8 miles from the Mexican National Railway. The mines controlled by this syndicate consist of 32 in number, all situated in the above named districts. They lie in the spurs of the Sierra Madre range of mountains, the richest mineral zone of Mexico. Six are in the Chapatuato district, 11 in Ozumatlan and 15 in the Sinda district. The control of these mines has been obtained through the instrumentality of Mr. William Denton, M. E., who has spent 25 years in Mexico, and who acquired them in the latter part of 1880. It is without doubt the greatest mining enterprise ever presented to the attention of American investors, and is a strong, successful corporation. The properties comprise the richest and best of the gold and silver mines in the State of Michoacan, and have been declared, after the most thorough examination by practical and intelligent experts, to be the most valuable in the State. The money subscribed for the syndicate stock was not to purchase the properties, but to develop them, being put into the actual working of the mines, for which the syndicate receives a two-thirds interest in each mine. Their richness is not at all problematical or a matter of speculation, but an established, recorded, historical fact, based upon incontrovertible authority, proved by Governmental registration of production of a great many millions of dollars.

The mines heretofore have been worked in the most primitive manner, and yet the fabulous wealth extracted from them, carried out on the heads of Indians, was obtained within a comparatively few feet from the surface, and from those ores only that were easily worked. When these mines are opened up in a systematic manner their yield will not fail to attract the attention of the world. They are well located and within an easy ride of the railroad, and will ere long be within six days' ride from the City of New York, there being now some 17,000 men at work on the last 100 miles of railroad.

These mines will probably never suffer from litigation, such as is so prevalent with mining properties in this country unless covered by United States patents. Since Mr. Denton's reports the mines have been thoroughly examined, and are pronounced to be of great value, even surpassing Mr. Denton's original reports, upon which the syndicate based its organization. All of the conditions ne-

cessary for a great and successful enterprise are found in these districts, and no one who has not personally visited the mines can comprehend their enormous value and limitless possibilities. These properties have been examined and reported upon by William Denton, M. E., A. D. Foote, M. E., and J. C. Simpson, M. E., gentlemen thoroughly competent in education, practical experience, and a most thorough knowledge of mineralogy. The mines of the Chapatuato group are situated south-east of the city of Morelia, State of Michoacan. The San Nicolas is a well-defined fissure vein, from 50 to 300 feet wide, resembling the famous "Homestake" of Dakota, with an average value of $140 in gold and silver per ton. The La Bufa is a formidable vein, and thoroughly defined. The Santa Rita de la Cota is an old mine, with a vein 13 feet wide, being very rich and abundant. The Divina Providencia lode runs into the San Nicolas, with a shaft 60 feet deep in good ore 3 to 6 feet wide. The La Purissima shows on the surface a vein five inches wide, and has a tunnel in 250 feet on the vein in good ore 8 feet wide. The workings in this mine show ore everywhere, the average value of which runs about $75 net a ton, but allowing only $20 per ton profit would give in sight in the present workings over $2,000,000, which, added to the amount in sight in the tunnel ($4,500,000), would give nearly $7,000,000 now in sight in this mine.

The Ozumatlan group are somewhat nearer Morelia. The product of this group has paid to the Church alone over $5,000,000. The Guadalupe has a tunnel over 1,500 feet long, 12 feet wide, and 8 feet high, graded sufficiently to completely drain the mine, and has cost over $70,000. At a distance of 812 feet from the mouth of the tunnel they have cross-cut two immense veins. At 1,500 feet the tunnel cuts the Guadalupe vein, which is from 12 to 15 feet wide and averages $200 a ton, while it frequently runs as high as $800 a ton. This mine is capable of producing 100 tons a day. Mr. A. D. Foote, in his report, in estimating the quantity of ore in sight, says: "The veins show large bodies of ore at intervals of 7,000 feet in length. There is an average of 1,000 feet of these veins above the level of the Guadalupe tunnel. Their thickness, so far as known, averages over 4 feet. The assay value of the ore averages about $200 a ton. Allowing one-half of the length of the vein to be barren, leaving it only 3,500 feet long; allowing one-half of the height above the tunnel to be barren, leaving it 500 feet high; allowing one-half of the average thickness to be barren, leaving it 2 feet thick, and there are still 350,000 tons of ore left. Allowing this to give but a profit of $50 per ton from an assay value of $200, and there is a *profit* of $17,500,000 standing above the tunnel level. This would be one-eighth of the estimated size of the vein.

The Purissima mine is a little south of the Guadalupe, and is developed by three shafts, from 30 to 80 feet deep, with drifts run in on the vein, which has an average width of 10 feet, the ore running a hundred dollars a ton. The San Vicente is an exceedingly strong vein, with an average width of 15 feet. The El Carmen has a tunnel driven into the side of the hill on the vein, having an average width of 7 feet, its ores being valued at $75 per ton. The Siuda group are about 30 miles south-east of Morelia, and embrace the following mines: La Purissima, San Miguel, Santiago, Concepcion, Corazon de Jesus, Dolores, San Ambrosio, and several other mines, all situated on the side of a mountain, from 300 to 500 feet from the summit of the range. The developments of these mines have been made by tunnels, from which shafts have been sunk from 30 to 100 feet in depth. The San Miguel is reached by a shaft 30 feet in depth from the tunnel, from which levels have been run both ways, opening up over 300 feet on the vein, the average value of the ores being $25. In addition to the above mines, the syndicate are also interested in the Bancos de Oro gold deposits at a place called Tiquio, three leagues west of Morelia, which promise large results, also several mines in Tzitzio, which are only claimed as prospects.

The capital stock of the syndicate is 60,000 shares, of which 45,000 shares were taken by the American and Mexican promoters of the enterprise, and the money thus raised was devoted to an extended examination and preliminary working of the properties. The remaining 15,000 shares will probably be offered at $12.50 a share, for additional treasury money. The great advantage of purchasing the syndicate stock is in the fact that as rapidly as companies are formed the syndicate stock receives its pro rata share of the stock of the different companies so organized, which will augment their profits a hundred-fold; *i. e.*, each 100 shares of syndicate will receive as dividends about 1,200 shares of sub-companies stock organized under the syndicate. There are at present six companies organized, representing a capital of $36,000,000, so that a holder of 100 shares of syndicate stock would receive from these six companies over $24,000 at par of their combined stock, besides sharing in like proportion in all other companies organized, of which there are several now in course of organization, all of which are full paid and non-assessable. The dividends from these stocks alone will pay very largely in the near future. Seldom, if ever, has a project that could be more heartily commended been placed before the investing public. In addition, it is a pleasure to state that the Government is a stable and permanent one, and it is safe to assume that Mexico, indorsed by our wisest statesmen, has entered upon a career of peace and prosperity, and all the millions of American capital invested in her

mines and railways is a tacit guarantee that the present Government will be maintained. Certainly, no better, safer or more profitable character of investment can be found in the market. The titles of all these properties are indorsed by the Government, and are considered the best possible.

The Michoacan syndicate numbers among its stockholders and Directors such gentlemen as Gen. C. H. Tompkins, President Diamond Drill Company; Gen. Benjamin F. Butler, of Massachusetts; Wm. C. Francis, Francis Axe Co., Buffalo; Louis Janin, the eminent mining engineer; William B. Miller, Esq., of Panmure, Scotland; Panmure Gordon, Esq., of London; Ozra Bailey, Director Atlantic and Pacific Railroad; Gen. Riva Palacio, late Minister of the Interior, Mexico; Señor Ed. Caulfield de Pons, Paris; James Sullivan, National Mexican Railway; Señor Octaviano Fernandez, Governor State of Michoacan, Mexico; United States Senator John P. Jones, of Nevada; Gen. Thos. Jordan, Editor "Mining Record"; W. C. Fitzsimmons, President People's Bank, Tecumseh, Mich.; Señor Pedro Gutierez, Agent of the Vatican, Mexico; ex-United States Senator Alexander McDonald; the Hon. Robert H. Baker, United States Government Director Union Pacific Railroad; the Hon. W. C. Bennett, Salt Lake City, Utah; John B. Bothwell, of Clark & Bothwell, Mine Managers; Col. Drake De Kay, New York; David Fergusson, late President of Vera Cruz Railroad; Gustavo J. Gravenhorst, and Señor Manuel M. Solorzano, bankers, Morelia, Mexico.

All the mines owned by the syndicate are productive, there being now over $180,000 of ore on the dumps, which has cost but $6,061 to extract, including cost of tools, &c. Several of the mines are now in Bonanza and could easily supply two or three large mills, from which dividends could be expected within 60 days after starting up the machinery. The most important of all is the fact that nothing is paid for the mines, all money subscribed by the Americans being only for working capital. Every day's experience reveals new and important movements looking to the most significant developments of the mineral riches of Mexico. American enterprise and capital is fully aroused and being directed to this region, which in the past has given more than its share to the mineral wealth of the world, and which will contribute in the future more than the imagination can hardly compass. In four years Mexico produced—*i. e.*, from 1785 to 1789—the enormous sum of $778,400,000, and this was extracted in the rudest manner. Now the time has come when, by our improved methods, the riches emboweled in the earth, of which these vast acquisitions were but the surface manifestations, will pay even larger tribute to man's genius and energy.

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